

EXHIBIT 7

REDACTED

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**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
SHERMAN DIVISION**

The State of Texas, et. al.,
Plaintiffs,

vs.

Google LLC,
Defendant.

Case No: 4:20-cv-00957
Sean D. Jordan

EXPERT REPORT OF MICHAEL R. BAYE
August 6, 2024

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16) In this report, I correct the errors made by Professor Gans and other of Plaintiffs' experts. My analysis shows that, consistent with observed industry outcomes, Google faces substantial competition both from within and outside of Professor Gans' overly narrow candidate markets and has operated its ad tech stack in line with its incentive as a multi-sided platform to balance the interests of publishers, advertisers, and internet users.

A. Ad Tech is a Dynamic and Growing Industry Marked by Vigorous Competition (Section V)

17) Publishers of digital content (e.g., a website or an app) can choose to sell advertising space ("inventory") alongside that content. If they do, each person who navigates to the content (a "user") provides an opportunity for a digital advertisement to be shown (an "impression"). Advertisers can choose to purchase these impressions to reach users. "Ad tech" is technology that facilitates these purchases by matching publishers whose content has attracted users with advertisers hoping to reach those users. Some ad tech tools are publisher-facing (such as ad servers, which help publishers manage ad inventory and serve ads), and others are advertiser-facing (such as buying tools designed to help advertisers purchase ad inventory). In all cases, ad tech works to facilitate a "match" between a publisher and an advertiser.

18) Google competes with a host of providers of ad tech tools, and the number of firms participating in the ad tech industry has increased over the years. Google's buying tools include Google Ads and DV360. There are numerous firms that offer competing buying tools, including Meta, Amazon, TikTok, The Trade Desk, Criteo, Microsoft's Xandr, and many more. Google's publisher-facing tool in this case is Google Ad Manager ("GAM"). GAM integrates functionality that used to be part of a separate publisher ad server (DoubleClick for Publishers ("DFP")) and functionality that used to be part of a

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separate ad exchange (“AdX”). Ad exchanges are tools that use auctions to match publishers and advertisers and facilitate sales of impressions. There are many other firms that offer competing ad exchanges, including Magnite, Microsoft’s Xandr, PubMatic, and Index Exchange. In addition, rival firms have developed new technologies such as header bidding to match advertisers and publishers. There are many header bidding solutions from which customers can choose, including popular offerings from Amazon and others. There are also numerous firms that provide competing publisher ad servers, including Microsoft’s Xandr, Kevel, Equativ, and others. Further, various publishers have developed their own technologies for serving ads in-house, such as Disney+ and Hulu.

19) Within this competitive landscape, Google’s business model critically depends on internet users being able to view valuable publisher content. The value of Google’s keystone product (Google Search) as well as its ad tech products derive from the existence of valuable internet content for users to consume. Google therefore has an enhanced incentive to continuously improve the quality of its ad tech to (a) protect internet users from annoying or irrelevant ads, (b) provide tools that publishers can use to monetize content, and (c) ensure that the returns on ad spend that advertisers earn on the web are competitive with what they can achieve by reaching users on social media, apps, and other media.

20) Professor Gans portrays Google as a monopolist whose conduct has foreclosed competitors, lessened competition, and ultimately harmed advertisers and publishers. The economic evidence tells a far different story. Economists generally consider industry output, price, and quality to be key indicators of whether an industry is competitive and customers have been made better off as a result. As I explain in my report, during the period in which Plaintiffs claim Google has monopolized the ad tech industry, output and quality have increased, while prices have fallen. Such conditions are exactly what one would

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significant percentages of small and large advertisers would substitute to display ad formats and types that Professor Gans excludes from his narrow candidate markets (including social media, video, mobile ads) if confronted with a SSNIP.

64) It also is relatively commonplace for advertisers to allocate a large share of their ad spend to non-Google ad buying tools. Approximately 62 percent of advertisers that multi-home using Google's ad buying tools and some other ad buying tools allocate at least 10 percent of their ad spending to non-Google ad buying tools, while approximately 30 percent of advertisers in that group allocate at least 50 percent or more of their ad spending to non-Google ad buying tools.

65) Many publishers also multi-home across exchanges. About 45 percent of publishers who use AdX or DFP multi-home by selling inventory across AdX and at least one other exchange, either through header bidding or Google's Open Bidding. Publishers also multi-home across different monetization strategies.

66) ***Data are Inconsistent with Anticompetitive Foreclosure in Professor Gans' Candidate Markets*** Data show that there is a consistently high number of third-party exchanges and demand-side platforms that are competing against Google's ad buying tools. Between June 2018 and March 2023, the number of competing third-party exchanges appearing in Google data never fell below 40 when limited to Professor Gans' narrow definition of display ads. Similarly, the average number of exchanges through which Google's AdX and DFP publishers sell display ads (narrow) has grown from about 2.0 exchanges in 2018 to about 3.7 exchanges in 2023. When limited to Professor Gans' narrow definition of display ads, the aggregate volume of impressions transacted by third-party exchanges is larger than the total volume of impressions that AdX transacts from advertisers using Google Ads. Further, the number of

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and do access the ad spend of Google Ads advertisers without Google Ads. Documents and publicly available information also show that Google allowed publishers to use third-party ad servers to reach bids from Google Ads. For instance, since June 2016, approximately \$ [REDACTED] in ad spend has gone through third-party exchanges. In fact, the amount transacted monthly by U.S. advertisers on Google Ads through third-party exchanges is significant, having grown from \$ [REDACTED] in June 2016 to \$ [REDACTED] in January 2023, providing further evidence that advertisers using Google Ads were accessible from non-Google exchanges.

80) Fourth, Professor Gans claims that Google only allowed publishers that license Google's ad server to receive real-time bids from its ad exchange. It is important to note that this claim is not that publishers could not receive access to AdX advertisers (which they could, as the data described above demonstrates), but only that they could not receive *real-time bids* from AdX. That distinction is significant because Plaintiffs and Professor Gans do not claim that real-time bids from AdX are a distinct product to which DFP is being tied. Indeed, Professor Gans defines a relevant market for ad exchanges generally, not for real-time bids from Google's ad exchange in particular. In reality, real-time bidding is simply a discrete feature available to publishers that license DFP. A feature that a company adds to a product to attract customers reflects competition, not a product for purposes of tying analysis. There is nothing unusual about a firm providing a feature that works more efficiently with its own tools than with third-party tools.

81) Fifth, Professor Gans argues that Google contractually tied DFP to AdX by providing access to both through a single contract (sometimes referred to as the DRX contract). But he provides no evidence that signing a DRX contract prevented AdX publishers from using third-party ad servers. I find

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96) ***Line Item Capping.*** Publishers create “line items” in Google’s ad server to identify the types of ad inventory that they will offer to various sources of demand. For some implementations of header bidding, publishers created separate line items for every possible bid that they might receive from a header bidding exchange, greatly increasing the total number of line items.

97) The record indicates that Google established limits on the number of line items—capping publishers at 61,000 active line items per publisher network—to prevent excessive line items from reducing the performance of its system. The limit was imposed after one publisher had 8 million line items and strained Google’s system. Professor Gans asserts that line item capping harmed competition in his ad exchange market because it restricted header bidding exchanges. But line item capping had a legitimate business rationale and was a procompetitive business practice that mitigated negative externalities to preserve the health of Google’s system and prevent performance issues that could impede publishers’ ability to sell ad inventory.

98) Professor Gans’ conclusions about line item capping are not based on any data analysis showing that line item caps impacted competition from header bidding. He shows no impact on price or competition. Nor does Professor Gans point to any documents that demonstrate actual reductions in market outcomes stemming from line item caps. His conclusion of market impact appears to be based solely on the isolated experiences of four publishers. Contrary to Professor Gans’ conclusions, the data show that line item caps did not reduce header bidding transactions by publishers who were close to the line item cap. Such transactions doubled between January 2019 and January 2022, while Open Bidding transactions by those same publishers declined. Publishers who were using a number of line items close to the cap therefore neither decreased their reliance on header bidding nor increased their reliance on

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A. The Ad Tech Industry and Its Stakeholders

128) “Ad tech” is technology that facilitates the buying and selling of digital advertising.

Professor Gans² focuses on three specific components of ad tech: publisher ad servers,³ ad buying tools,⁴ and ad exchanges.⁵

129) Publishers of digital content (e.g., a website or an app) can choose to sell advertising space (“inventory”)⁶ alongside their content. If they do, every user⁷ who navigates to the content provides a

² Gans Report, at ¶120. (“I find there are four relevant product markets: (1) the market for publisher ad servers used for open web display advertising inventory, (2) the market for ad exchanges for transacting indirect open web display advertising, (3) the market for ad buying tools for small advertisers for buying open web display advertising space, and the market for ad buying tools for large advertisers for buying open web display advertising space.”). Note that Professor Gans references four markets, as he lists ad buying tools for small and large advertisers separately.

³ Ad servers are tools that “allow publishers to manage ad slots on their websites and display ads that have been sold directly to advertisers via direct campaigns” and “act as a management platform helping to decide which [indirect ads] to serve in their ad slots.” (Amazon Ads, “What is adtech and why is it important?” available at: <https://advertising.amazon.com/library/guides/what-is-adtech>. Accessed April 16, 2024). They are also “responsible for targeting, i.e. making decisions about which ads to display on a website based on nuanced targeting parameters, serving them, and collecting and reporting the data (such as impressions, clicks etc.)” and are “used for inventory forecasting—i.e. [predicting] how much inventory and of what type the publisher will have available for sale in the future based on the current campaigns & traffic projections.” (Maciej Zawadziński and Mike Sweeney, “What is an Ad Server and How Does It Work?” Clearcode, July 17, 2024, available at: <https://clearcode.cc/blog/what-is-an-ad-server/>).

⁴ While Professor Gans uses the phrases “ad buying tools for large advertisers” and “ad buying tools for small advertisers,” these terms are not commonly used by practitioners in or commentators on the industry, and the use of ad buying tools is not strictly in accordance with customer size. (Gans Report, at ¶13). In his deposition, [REDACTED] refers to a slide from a 2015 Google report, stating that “it seems to suggest that size is not the only determinant of what an advertiser might want to do.” The referenced slide discusses target use cases that apply to customers of all sizes, including the need for broad reach/access. (Deposition of [REDACTED] on March 30, 2021, GOOG-AT-MDL-007173623, at 72:6-13, 108:23-25; GOOG-DOJ-03238507, at -09). **Instead, it is common for such tools used by ad buyers to be referred to as “demand side platforms” (or DSPs) or “ad networks.”** See Publifit, “What is a Demand Side Platform (DSP) and How It Helps Publishers,” available at: <https://www.publifit.com/blog/what-is-a-demand-side-platform-dsp>. Accessed July 29, 2024; Mike Sweeney, “What Is a Demand-Side Platform (DSP) and How Does It Work?” Clearcode, January 31, 2024, available at: <https://clearcode.cc/blog/demand-side-platform/>. Accessed July 29, 2024; Criteo, “What is an ad network? A guide for advertisers and publishers,” available at: <https://www.criteo.com/blog/what-is-an-ad-network-a-guide-for-advertisers-and-publishers/>. Accessed July 29, 2024.

⁵ “An ad exchange is a virtual marketplace where publishers and advertisers connect to buy and sell digital ad space without the need for an intermediary.” This buying and selling “happens through real time bidding (RTB) in which several participants bid on the available ad inventory. The highest bidder wins the right to display their ads on the selected ad space.” (Brock Munro, “What is an Ad Exchange and How Does it Work?” Publifit, April 15, 2024, available at: <https://www.publifit.com/blog/what-is-an-ad-exchange>).

⁶ Adjust, “What is ad inventory?” available at: <https://www.adjust.com/glossary/ad-inventory/>. Accessed July 29, 2024. (“Inventory is the total number of ad placements or ad space a publisher has available for advertisers to purchase in order to display their advertisements.”).

⁷ To avoid confusion with customers who “use” ad tech, I refer to those viewing ads as “users,” “internet users,” or “content viewers” and publishers and advertisers who use ad tech as “customers.”

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distinct ad opportunity (an “impression”)⁸ for a digital advertisement to be shown to that viewer. Advertisers can choose to purchase this inventory to reach users (i.e., internet users or content viewers), with the goal of generating results from those impressions that are performance-based and have a high return on investment.

130) Every day, the behavior of users generates billions of impressions that can be sold to advertisers. Each of those sales occurs almost instantaneously (within milliseconds) so that advertisements can be shown to a particular user. These billions of transactions are possible because of complex engineering systems capable of instantaneously linking the publisher and advertiser sides of the marketplace.

131) The ad tech industry facilitates these transactions between publishers and advertisers. The industry succeeds when this process works effectively, which includes balancing often conflicting interests of advertisers, publishers, and users.

132) Ad tech is a dynamic industry that features competition between different business models for facilitating these transactions. The complexity and ongoing evolution and integration of the industry blur the lines between components of the ad tech stack.⁹ Some ad tech companies (e.g., The Trade

⁸ Adjust, “What is an impression?” available at: <https://www.adjust.com/glossary/impression/>. Accessed July 29, 2024. (“An impression ... is when a user sees an advertisement. In practice, an impression occurs any time a user opens an app or website and an advertisement is visible.”).

⁹ The ad tech stack refers to the “various ad platform and tool components that [are] used” by “publishers, advertisers, and other parties to buy, sell, and manage digital advertising.” These components include ad buying tools, ad exchanges, and ad servers, along with supply side platforms (or SSPs), which publishers use to sell ad inventory programmatically, often including robust options for publishers to control their sales. While “traditionally, ad exchanges were separate platforms that SSPs connected to,” major SSPs now integrate an ad exchange as a component in their platform. (AdButler, “What is AdTech? Basics of The Ad Tech Ecosystem Explained,” AdButler Blog, May 5, 2021, available at: <https://www.adbutler.com/blog/article/what-is-ad-tech-the-ad-tech-ecosystem-explained>). Similarly, sell side products used by publishers have also seen an expansion in functionality that blurs old product category borders. For instance, The Trade

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Desk)¹⁰ primarily market their tools and services to advertisers, while others (e.g., Kevel)¹¹ market their tools and services to publishers. Some ad tech companies (e.g., Microsoft, whose ad tech stack is branded as Xandr) market their ad tech to both advertisers and publishers.¹² Still other ad tech companies (e.g., Meta, Google, and Amazon) compete for advertisers and/or publishers, but also use their own ad tech to sell digital advertising on their respective properties.¹³ Economic theory indicates that even if a company exclusively or primarily uses its own ad tech in this way, its presence in the industry provides other firms

Desk launched “OpenPath” functionality in 2022, allowing its advertisers to buy ad inventory directly from publishers without a middleman. (Seb Joseph and Ronan Shield, “‘A clean, unadulterated supply chain’: The Trade Desk on a year into its OpenPath direct deals with publishers,” Digiday, March 7, 2023, available at: <https://digiday.com/marketing/a-clean-unadulterated-supply-chain-the-trade-desk-on-a-year-into-its-openpath-direct-deals-with-publishers/>).

¹⁰ The Trade Desk, “What we do,” available at: <https://www.thetradedesk.com/us>. Accessed July 29, 2024 (“Our self-serve, transparent software helps advertisers use the best available data to reach audiences on the open internet at every stage of the funnel - from awareness to engagement to conversion.”); Snowflake Blog, “How The Trade Desk Uses the Data Cloud to Thrive in the Dynamic AdTech World,” December 16, 2021, available at: <https://www.snowflake.com/blog/how-the-trade-desk-uses-the-data-cloud-to-thrive-in-the-dynamic-adtech-world/>. (“[The Trade Desk’s] self-service software helps advertising agencies and brands around the world make data-driven decisions on the digital media purchases they make on the open internet across inventory including desktop, mobile, audio, connected TV, and out-of-home advertising.”).

¹¹ OKO, “Best publisher ad servers on the market,” February 16, 2023, available at: <https://oko.uk/blog/best-publisher-ad-servers-on-the-market>. (“Publishers have come to enjoy many of the individual features that Kevel has on offer, such as the ability to fully control a campaign of any size, create functional reports, and access expert support at any time.”); James Avery, “Adzerk Raises a Series A and Rebrands to Kevel,” Kevel, December 6, 2020, available at: <https://www.kevel.com/blog/adzerk-rebrand-kevel>. (“Kevel’s mission is to provide ad serving APIs that offer publishers more freedom to build what they want; more action to start making new revenue quickly; and more humanity to monetize with ads that aren’t terrible.”).

¹² Xandr was known as AppNexus from 2007 to 2018, when AT&T acquired it and rebranded to Xandr. (Alyson Shontell, “Inside One Of New York’s Greatest Startup Success Stories, AppNexus,” Business Insider, November 3, 2011, available at: <https://www.businessinsider.com/appnexus-office-tour>. (“AppNexus was founded in 2007 by Brian O’Kelley and Mike Nolet.”); Ronan Shields, “AT&T Unveils Xandr, Its Newly Rebranded Ad-Tech Unit,” AdWeek, September 25, 2018, available at: <https://www.adweek.com/programmatic/att-unveils-xandr-its-newly-rebranded-ad-tech-unit/>. (“AT&T today announced the rebrand of its AdCo unit, unveiling Xandr[,] ... [which] will house all of the telco’s data-led offerings, including ... the recently acquired ad-tech unit AppNexus.”)). In 2021, Microsoft acquired Xandr from AT&T. (James Hercher, “Xandr, Formerly AppNexus, Is Now Formerly AT&T, After Its Acquisition By Microsoft,” AdExchanger, December 21, 2021, available at: <https://www.adexchanger.com/online-advertising/xandr-formerly-appnexus-is-now-formerly-att-after-its-acquisition-by-microsoft/>. (“AT&T has sold its ad tech business Xandr to Microsoft.”)). According to a 2016 Google strategy document, AppNexus had more than a 9 percent share of ad server business in the second quarter of 2016, and “AppNexus has built a sizeable footprint, with —15-20% of our ad-serving size and 1/3 of our Exchange size.” (GOOG-DOJ-04424050, at -69-70).

¹³ Peter Westberg, “The Rise of Google, Meta, Amazon, and Youtube in Advertising,” Quartr, May 24, 2024, available at: <https://quartr.com/insights/company-research/the-rise-of-google-meta-amazon-and-youtube-in-advertising>. (“Google Ads ... allow[s] businesses to display ads in [Google] search results based on the keywords typed by users.” “[Meta’s] platforms ... provid[e] a fertile ground for advertisers looking to target specific demographics with precision.” “[Amazon] has ... develop[ed] a range of advertising products that allow businesses to place their products in front of consumers at critical moments in the shopping journey.”).

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strong incentives to offer a competitive mix of price and quality.¹⁴ All of these different options compete to facilitate matches between advertisers and impressions at publishers.

133) This facilitation is important because customer groups served by ad tech firms may have conflicting interests. For example, advertisers generally prefer lower ad prices, publishers generally prefer higher ad prices, and users generally prefer fewer, but more relevant, ads. In particular:

- a. Publishers are customers who may use ad tech to sell ad space on their digital properties as a way of monetizing content. Publishers seek to attract users and have a variety of options for monetizing viewer traffic to their digital properties.¹⁵
- b. Advertisers are customers who purchase ad space on which to place digital ads to gain the attention of users. Advertisers have many options for reaching users. The typical user accesses content through a variety of different digital environments, including social media, shopping, news, blogs, and a variety of others, both via websites and via mobile apps.

¹⁴ Firms that primarily or exclusively use their ad tech to meet their own needs may satisfy the DOJ and FTC's definition of a *rapid entrant*: "Firms that are not currently active in a relevant market, but that very likely would rapidly enter with direct competitive impact in the event of a small but significant change in competitive conditions, without incurring significant sunk costs, are also considered market participants. These firms are termed 'rapid entrants.'" (Department of Justice & Federal Trade Commission, *Merger Guidelines*, 2023, at p. 49; see also Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, 2010, at pp. 15-16).

¹⁵ In addition to selling ad space, publishers also can monetize their content through subscriptions, sale of data to third parties, affiliate links, and sponsorships. See Kean Graham, "Website Monetization Strategies For Publishers," MonetizeMore, August 11, 2021, available at: <https://www.monetizemore.com/blog/website-monetization-strategies-for-publisher/>. ("Subscription models entail charging your visitors a monthly or yearly fee for access to membership sites and exclusive, high-quality content." "When you include affiliate links on your website, you will earn a commission for each person who clicks on your affiliate link." "Sponsored Content: Publishers work with a company to create or publish promotional materials inside their website content."). See also Eyeota, "Publishers: How to Make Additional Revenue from your Data," available at: <https://www.eyota.com/blog/publisher-data-monetization-basics>. Accessed July 30, 2024. ("There are various ways that publishers and data owners can activate their data within the online advertising ecosystem and begin to generate revenue from it." These include: "Anonymous Data Marketplaces," "Private Data Marketplaces," and "Publisher Alliances.").

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- c. Users are not direct customers of ad tech, but are relevant stakeholders in the ad tech ecosystem, with the relevance of an advertisement to a particular user affecting the value of matching the advertisement to an impression for that user. The typical user accesses content through a variety of different digital environments, including social media, shopping, news, blogs, and a variety of others—not only through websites, but via mobile apps and connected TV (CTV).

134) Publishers that sell digital ad space have a variety of options for selling their ad inventory, including direct deals with advertisers and indirect ad sales that dynamically match advertisers to ad inventory.¹⁶ Publishers also have a variety of ways they can monetize content using direct deals¹⁷ and indirect ads sales.¹⁸

135) Publishers are not only free to choose whether to use ad tech to monetize content, but which ad tech to use. Some publishers use only one component of the ad tech stack,¹⁹ while others use multiple

¹⁶ This matching occurs through auctions, where advertisers submit bids for the right to have their ads displayed to internet users viewing publisher content. (See Holly Shuffett, “What are Ad Auctions? The Definitive Guide,” Kevel, May 16, 2024, available at: <https://www.kevel.com/blog/ad-auctions>. Accessed July 30, 2024). Professor Milgrom has submitted a report that discusses these auctions in more detail.

¹⁷ For example, publishers can use ad tech to negotiate direct sales with advertisers (e.g., “programmatic direct” deals), they can engage in bilateral negotiations with an advertiser to set the terms of a deal, and publishers and advertisers can engage third parties (i.e., agencies) to transact these deals. (AdPushup, “Programmatic Deals vs. Direct deals – Detailed Comparison for Publishers,” available at: <https://www.adpushup.com/blog/programmatic-vs-direct-deal/>. Accessed July 30, 2024).

¹⁸ For example, publishers can sell ad space through open ad auctions on an exchange, through header bidding auctions among exchanges, through private auctions with curated lists of bidders, and through networks that may determine matches through means other than auctions. (Brock Munro, “What is an Ad Exchange and How Does it Work?” Publifit, April 15, 2024, available at: <https://www.publift.com/blog/what-is-an-ad-exchange>; Publifit, “How Does Header Bidding Work? Everything Publishers Need to Know,” available at: <https://www.publift.com/adteach/what-is-header-bidding-and-why-should-you-care>. Accessed July 30, 2024; Google Ad Manager Help, “Private Auctions overview,” available at: <https://support.google.com/admanager/answer/2987915>. Accessed July 30, 2024; Criteo, “What is an ad network? A guide for advertisers and publishers,” available at: <https://www.criteo.com/blog/what-is-an-ad-network-a-guide-for-advertisers-and-publishers/>. Accessed July 29, 2024).

¹⁹ For example, according to Google data, Rogue Media, Tokyopop, and AboutJobs.com are websites that sell ad inventory using AdSense but do not use Google’s AdX exchange or use DFP to choose from non-Google sources of demand. CVS is a pharmacy chain

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components.²⁰ Some publishers exclusively sell ad inventory through a single ad tech provider,²¹ while others sell inventory through multiple ad tech providers.²² Publishers also are free to change ad tech providers.²³ Some publishers develop and use their own ad tech,²⁴ and sometimes have commercialized

and website that appears in Google's DFP data but does not sell ads indirectly through AdX or AdSense. (These examples are identified in the backup to my report using MDL RFP 243 AdSense Backfill Data, MDL RFP 243 AdX Data, and MDL RFP 243 DFP Reservations Data).

²⁰ For example, according to Google data, NBA.com, Zillow Group, and Tennis World sell ads through AdSense and AdX and do not use DFP to choose from other (non-Google) sources of demand. Additionally, TheOnion.com, Urban Dictionary, Glassdoor, Inc., Chess.com, Long Beach Post, and The Washington Times sell ads through AdSense and AdX along with using DFP to serve ads from non-Google sources of demand (which can include header bidding exchanges, ad networks, other remnant sources, direct deals, or even non-monetized ads such as house ads). (These examples are identified in the backup to my report using MDL RFP 243 AdSense Backfill Data, MDL RFP 243 AdX Data, and MDL RFP 243 DFP Reservations Data).

²¹ For example, the Ads.txt file posted at MIT indicates that it chooses to solely use Google to sell its ads, the Ads.txt file posted at BizBash indicates that it chooses to solely use Sharethrough to sell its ads, and the Ads.txt files posted by Amazon states, "Amazon programmatic inventory is not available for purchase through non-Amazon sellers or resellers." Reddit, Facebook, Walmart, and TikTok have similar statements. (See, e.g., Massachusetts Institute of Technology, "ads.txt," available at: <https://web.mit.edu/ads.txt>. Accessed July 22, 2024; BizBash, "ads.txt," available at: <https://www.bizbash.com/ads.txt>, Accessed July 22, 2024; Amazon, "ads.txt," available at: <https://www.amazon.com/ads.txt>. Accessed March 27, 2024; Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20210517155726/http://reddit.com/ads.txt>. Accessed March 25, 2024; Facebook, "ads.txt," available at: <https://www.facebook.com/ads.txt>. Accessed April 19, 2024; Walmart, "ads.txt," available at: <https://www.walmart.com/ads.txt>. Accessed March 27, 2024; Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20210517160622/http://tiktok.com/ads.txt>. Accessed March 27, 2024).

²² For example, the Ads.txt file for The Washington Post indicates that it sells inventory through Google and many other providers, including Microsoft's AppNexus/Xandr, Facebook, Amazon, NBC Universal's FreeWheel, OpenX, Index Exchange, TripleLift, PubMatic, Smaato, Rubicon, and numerous others. (The Washington Post, "Ads.txt," available at: <https://www.washingtonpost.com/ads.txt>. Accessed July 22, 2024).

²³ Although Disney, Reddit, and Walmart have developed their own publisher ad servers, they have previously used Google's publisher ad server. (Tim Peterson, "How Disney is using its audience data and Hulu's ad tech to compete with Google, Meta and Amazon," Digiday, March 3, 2020, available at: <https://digiday.com/future-of-tv/how-disney-is-using-its-audience-data-and-hulus-ad-tech-to-compete-with-google-meta-and-amazon/>, ("[T]oday it's a combination of [Google's ad server and Hulu's ad server]. Ultimately, it will all be on the Disney ad server.")). Likewise, publishers also change the ad tech that indirectly sells their ad inventory. CNN's list of third parties authorized to sell its inventory has grown steadily from a few dozen in 2017 to several hundred lines of authorized sellers today (See Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20171105043016/https://www.cnn.com/ads.txt>. Accessed April 29, 2024; Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20240320192113/https://www.cnn.com/ads.txt>. Accessed July 22, 2024). Prior to severing all programmatic exchanges from its inventory, Reddit sold its inventory programmatically through many different third-party exchanges, including Google. (Internet Archive, "ads.txt," available at: <https://web.archive.org/web/20200805165649/https://www.reddit.com/ads.txt>. Accessed July 22, 2024).

²⁴ For example, Amazon, Meta, Disney, [REDACTED] For example, Disney's proprietary ad server "gives the company greater flexibility and control, in order to prioritize delivery behavior for ad clients and its own business." (Todd Spangler, "Why Disney Built Its Own Ad Server for Disney+ and Hulu – and What the YODA Does," Variety, January 22, 2023, available at: <https://variety.com/2023/digital/news/disney-ad-server-tech-disney-plus-yoda-1235497663/>); Walmart developed its proprietary ad buying tool in collaboration with The Trade Desk, leveraging existing programmatic technology and Walmart's first-party data. See Rich Lehrfeld, "Walmart Connect Launches Its New Demand-Side Platform, Walmart DSP, To Expand Its Off-Site Media Offerings at Scale," Walmart, August 25, 2021, available at: <https://corporate.walmart.com/news/2021/08/25/walmart-connect-launches-its-new-demand-side-platform-walmart-dsp-to-expand-its-off-site-media-offerings-at-scale>. ("Walmart DSP is a first-of-its kind demand-side platform

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components of their proprietary ad tech for use by other publishers and/or advertisers.²⁵ In the jargon of economics, competition in the ad tech industry is dynamic and includes many different types of actual and potential competitors.

136) Publishers are not limited with respect to the types of inventory they can sell, as they can and do choose to change their mix of ad types in response to changes in technology and user viewing habits. For example, publishers may display their content (and hence, their ad inventory) in a variety of different digital environments (e.g., on their websites, mobile apps, and/or the websites or applications of other platforms) to best suit their business needs and to respond to the preferences of users.²⁶ Users

that was built in partnership with the world's leading independent DSP, The Trade Desk. ... Unlike other DSP products in the market, our standalone platform combines the best-in-class technology and performance of The Trade Desk with the robust scale of Walmart's unparalleled first party omnichannel data.")). *See also* Amazon, "Ad tech solutions," available at: <https://advertising.amazon.com/adtech-solutions>. Accessed April 26, 2024 ("Our suite of ad tech solutions, including Amazon DSP and Amazon Marketing Cloud, help brands and advertisers reach their marketing goals, on Amazon and beyond."); Meta, "Move your business forward with Meta technologies," available at: <https://business.meta.com/>. Accessed April 26, 2024 ("Move your business forward with Meta technologies. Unlock your potential with marketing tools and ad solutions that take your business to the next level. Start advertising across Facebook, Messenger, Instagram, WhatsApp and more."); Deposition of [REDACTED] on April 25, 2024, (hereafter "[REDACTED]"), at 9:9-10 ("[REDACTED]").

²⁵ For example, third-party publishers can utilize Amazon, Microsoft, Meta, [REDACTED] ad tech. (Amazon Publisher Services, "Introducing Amazon Publisher Services," available at: <https://aps.amazon.com/aps/index.html>. Accessed July 19, 2024. ("Amazon Publisher Services helps leading publishers around the world grow their business with exclusive signals, collaborative technologies, and unique demand from Amazon."); Microsoft Advertising, "Publisher Platforms," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed March 18, 2024 ("Publisher Platforms: ... Xandr is uniquely positioned to offer you scaled, streamlined buying and selling platforms that are helping to shape the future of media monetization."); Meta, "Monetize My Content Refresh your revenue stream. Media and Publisher," available at: <https://www.facebook.com/business/goals/monetize-content/publishers>. Accessed July 29, 2024 ("Whether you're launching a new publication or diversifying your revenue model, Facebook monetization tools can help you earn more money."); Deposition of [REDACTED] on September 29, 2023, [REDACTED], at 15:24-16:6. ("[REDACTED]").

²⁶ For example, the Dallas-Fort Worth news broadcaster NBC DFW (a.k.a., NBC 5), monetizes its content with digital display ads on text and/or video news articles through its: a) website; b) mobile apps for phones and tablets; c) Apple News channel; d) live streaming channels; e) NBCUniversal's platforms such as Peacock and Xumo; f) a variety of connected TV solutions including Roku, FireTV, and

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strategies to reach users where they can be found,²⁹ whether that be on the web, on apps, on social media, or through connected television.

B. Ad Tech Allows Advertisers and Publishers to Buy and Sell a Variety of Types of Ads, Not Merely “Open Web Display Ads”

138) Ad tech industry sources define display ads as “visual ads”³⁰ that contain “video, image, or text elements to market products or services”³¹ and “captur[e] the attention of users[,] encouraging them to take action.”³² They include formats such as banner ads³³ (including text-based banner ads),³⁴ rich

²⁹ David Evans notes that “[a] typical advertiser will place display ads on multiple websites as well as several television shows to reach a large audience. However, as these methods are all designed to reach large numbers of people, they are probably substitutes at the margin.” (David S. Evans, “The Online Advertising Industry: Economics, evolution, and privacy,” *Journal of Economic Perspectives*, Vol. 23, No. 3, 2009, pp. 37-60, at p. 49).

³⁰ “Display advertising is defined as visual ads placed on websites, social media networks, or apps.” (Criteo, “Display Advertising, A-to-Z,” available at: <https://www.criteo.com/digital-advertising-glossary/display-advertising/>. Accessed April 26, 2024).

³¹ Intuit Mailchimp, “Display Ads,” available at: <https://mailchimp.com/marketing-glossary/display-ads/>. Accessed April 29, 2024. *See also*, e.g., Adobe Experience Cloud Team, “Display advertising — definition, types, and benefits,” Adobe Experience Cloud Blog, June 27, 2023, available at: <https://business.adobe.com/blog/basics/display-advertising>. Accessed July 23, 2024 (“Display advertising ... are usually a combination of text and images. ... Display advertising offers banner ads, pop-ups, pop-unders, wallpaper ads, interstitial ads, map ads, video ads, and more.”).

³² Adobe Experience Cloud Team, “Display advertising — definition, types, and benefits,” Adobe Experience Cloud Blog, June 27, 2023, available at: <https://business.adobe.com/blog/basics/display-advertising>. Accessed July 23, 2024.

³³ “A banner ad is a type of display ad (visual online advertisement) that’s placed in a prominent webpage location with the aim of drawing users’ attention.” [They] “are designed to send traffic to landing pages or other important webpages (like product pages) [a]nd generate conversions (desirable actions).” (Rachel Handley, “Banner Ads: What They Are & How to Create Them,” Semrush Blog, November 15, 2023, available at: <https://www.semrush.com/blog/banner-ads/>).

³⁴ Google ad tech allows for the placement of “text ad[s] typically includ[ing] a title that’s also a clickable link to a webpage, one or two lines of text, and a website address” as banner ads on publisher websites. (Google Ad Manager Help, “Example Text Ads,” available at: <https://support.google.com/admanager/answer/6258694>. Accessed June 11, 2023). These ads, as a subset of banner ads, are considered display ads in my analyses, and Google has clarified that in data it has produced in this matter “display ads include the ... ‘Text’” creative ad format. (GOOG-AT-MDL-C-000017381 at -398).

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media ads,³⁵ video ads,³⁶ interstitial ads,³⁷ and native ads.³⁸ Publishers are free to choose the types of ad creatives that advertisers can display on their content.³⁹ They may be transacted directly or indirectly⁴⁰ and appear “across websites, social media, and apps”⁴¹ as well as on connected TVs or related devices.⁴²

When I refer to “display ads” in the discussions and analyses that follow, unless otherwise stated, I include these types of ads that are commonly defined as display ads by industry participants⁴³ and as

³⁵ “[R]ich media [ads] ... involve[] using interactive elements such as video, audio, and clickable elements to make the advertisement more engaging.” (Chiradeep BasuMallick, “What Is Display Advertising? Definition, Targeting Process, Management, Network, Types, and Examples,” SpiceWorks, March 16, 2021, available at: <https://www.spiceworks.com/marketing/programmatic-advertising/articles/what-is-display-advertising/>).

³⁶ Video ads are a type of rich media ad “that play within a banner or expand to a larger size. These include in-stream video ads on platforms like YouTube, incorporating interactive elements.” (Deepak Sharma, “What Are Rich Media Ads? How publishers can use them to uplift ad revenue,” AdPushUp, April 25, 2024, available at: <https://www.adpushup.com/blog/rich-media-ads/>).

³⁷ “These are ads that appear as a separate webpage before you are directed to the original page that you wanted to visit on the internet. They are effective in capturing the user’s attention as they take up the entire screen.” (Chiradeep BasuMallick, “What Is Display Advertising? Definition, Targeting Process, Management, Network, Types, and Examples,” SpiceWorks, March 16, 2021, available at: <https://www.spiceworks.com/marketing/programmatic-advertising/articles/what-is-display-advertising/>).

³⁸ One industry publication of display ads lists native ads as a “common display ad type[.]” Further, “it’s important to note that native ads with visual elements actually fall under the category of display advertising.” (Asif Ali, “Display Ads: What They Are, Types, & How They Work,” Semrush Blog, October 26, 2023, available at: <https://www.semrush.com/blog/display-ads/#types-and-formats-of-display-ads>).

³⁹ Appendix V describes the types of ads available, by environment, to buy and sell third-party content using Google ad tech. For example, Google Ads lists Video Ads, Image Ads, App Promotion Ads, and Text Ads as possible ad types that can be displayed on desktop websites.

⁴⁰ “One of the most common questions that marketers face in buying display advertising is whether to contact a publisher or ad network directly to purchase inventory (called a Direct Buy), or through indirect channels using real-time bidding (RTB) systems.” (Ratko Vidakovic, “Display Ads: How Direct Buys & RTB Interact,” MarTech, March 4, 2013, available at: <https://martech.org/display-ads-how-direct-buys-and-rtb-interact/>).

⁴¹ Alexis Herrington, “How To Get The Most Out Of Your SaaS Display Ads,” ScaleCrush Blog, January 23, 2024, available at: <https://scalecrush.io/blog/saas-display-ads>.

⁴² “Display ads” are marketed as a format to advertisers looking to reach internet users through Connected TV ads. (Sprinkles Media, “Connected TV: A Guide To The Future Of Advertising,” available at: <https://www.sprinklesmedia.com/confectionary/connected-tv-a-guide-to-the-future-of-advertising>. Accessed July 24, 2024).

⁴³ See, e.g., Evelyn Mitchell-Wolf, “Display ad spending’s potential disruptors: What’s worth the buzz?” eMarketer, May 25, 2022, available at: <https://www.emarketer.com/content/display-ad-spending-potential-disruptors>. (“Digital display is a huge advertising category encompassing static images, rich media (e.g., interactive banners, video, digital audio), sponsorships, and native placements like promoted content and in-feed units on social networks and news sites.”). This definition is also consistent with public statements by ad tech businesses: “Display ads can help you promote your business when people are browsing online, watching YouTube videos, checking Gmail, or using mobile devices and apps.” (Google Ads, “Reach the right audience with Display Ads,” available at: https://ads.google.com/intl/en_us/home/campaigns/display-ads/. Accessed April 29, 2024.); “Display advertising is defined as visual ads placed on websites, social media networks, or apps. They are typically image, text, or video banner ads that when clicked on, take a user to a website or landing page.” (Criteo, “Display Advertising, A-to-Z,” available at: <https://www.criteo.com/digital-advertising->

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used by eMarketer.⁴⁴ Other categories of digital ads such as search,⁴⁵ audio,⁴⁶ and digital out-of-home⁴⁷ are generally excluded from these industry definitions of display ads, and consequently, from my analyses of display ads.

139) Professor Gans, however, focuses his report on a narrow subset of display ads he describes as “open web display.”⁴⁸ He excludes from his analysis several categories of display advertising,

glossary/display-advertising/. Accessed April 26, 2024.); “Display advertising refers to ads that are delivered online—via social media, stores like Amazon, or apps. These ads can feature text, images, animations, video, and/or audio.” (Amazon Ads, “Best display ad examples,” available at: <https://advertising.amazon.com/library/guides/display-ads-examples>. Accessed April 29, 2024.); “Display ads are images, videos, or gifs shown to users on websites or apps.” (Mailchimp, “Display Ads,” available at: <https://mailchimp.com/marketing-glossary/display-ads/>. Accessed April 29, 2024).

Even in 2012, the main page of Google Ads’ “Display Network” website described display ads as “Text Ads on websites,” “Image Ads on websites,” “Video Ads on websites,” and “Ads on Mobile Websites.” (Google Ads, “Display Network,” available at: <https://web.archive.org/web/20120701032721/http://www.google.com/ads/displaynetwork/>. Accessed July 29, 2024).

⁴⁴ Notes in eMarketer data indicate that display ad spending “includes advertising that appears on desktop and laptop computers as well as mobile phones, tablets, and other internet-connected devices for all formats mentioned; includes banners, rich media, sponsorships, video, and ads such as Facebook’s News Feed Ads and Twitter’s Promoted Tweets.” (GOOG-AT-DOJ-DATA-000066787, at ‘US Ad Spend Metrics’ tab, cell Y67).

⁴⁵ “Search ads vs Display ads[:] both serve different purposes in advertising. Search ads target users actively searching for products/services, with high intent & conversion rates.” (Ngoc Nguyen, “Search Ads vs Display Ads: Differences and Which to Choose,” Meta Digital, June 16, 2023, available at: <https://megadigital.ai/en/blog/search-ads-vs-display-ads/>. Accessed July 25, 2024).

⁴⁶ Industry sources recognize the distinction between display and audio ads; “Audio ads generate greater brand recall than display and online video ads.” (Megan Reschke, “Digital Audio Advertising in 2024,” Basis Technologies, February 15, 2024, available at: <https://basis.com/blog/digital-audio-advertising-in-2024>).

⁴⁷ “Digital out-of-home (DOOH) advertising ... offers some of the advantages of the technology used in online display advertising, such as targeting and enhanced traffic data, but at the same time it is completely immune to ad blockers, and OOH ads cannot be skipped by the user.” (Michal Wlosik, “What Is Digital Out-of-Home (DOOH) Advertising and How Does It Work?,” Clearcode, May 15, 2024, available at: <https://clearcode.cc/blog/what-is-digital-out-of-home-doo/>).

⁴⁸ See, e.g., Gans Report, at ¶¶79 (“Open web display ads are a distinct type of online advertising appearing on content providers’ or publishers’ websites to reach a target user or audience.”), 120 (“I find there are four relevant product markets: (1) the market for publisher ad servers used for open web display advertising inventory, (2) the market for ad exchanges for transacting indirect open web display advertising, (3) the market for ad buying tools for small advertisers for buying open web display advertising space, and the market for ad buying tools for large advertisers for buying open web display advertising space.”). Additionally, Professor Gans focuses his analyses on what the Complaint refers to as “indirect sales of web display ad[s].” (Fourth Amended Complaint, at ¶¶47, 92).

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facilitates the purchase and sale of many other types of digital ads, including in-app advertising, video advertising, connected television advertising, and social media advertising.

C. The Pricing of Ad Tech Services

142) Ad tech companies do not set the prices that advertisers pay for Professor Gans' narrow definition of display ad impressions; these prices are determined in auctions.⁶⁸ The pricing data on impressions in the record pertain to impressions purchased through auctions. The prices that winners pay at auction typically vary for reasons that may include variation in: bidder (advertiser) preferences for the inventory of different publishers,⁶⁹ publishers' preferences over different advertisers,⁷⁰ the number of advertisers and publishers competing to buy and sell ad inventory,⁷¹ type of auction⁷² and other auction

⁶⁸ Professor Gans' narrow definition of display ads excludes direct deals, which are negotiated directly between advertisers and publishers. Ad tech companies also do not set prices for and generally do not know the amounts advertisers pay publishers for (non-programmatic) direct deals. Several ad tech companies offer means of transacting "programmatic guaranteed" and other types of deals involving negotiated prices. The pricing terms of these deals are known to the ad tech companies that facilitate them. (See, e.g., Google Ad Manager Help, "Programmatic Guaranteed vs. Preferred Deals," available at: <https://support.google.com/admanager/answer/7637485>. Accessed July 29, 2024; Microsoft, "Create a programmatic guaranteed deal," available at: <https://learn.microsoft.com/en-us/xandr/monetize/create-a-programmatic-guaranteed-selling-line-item>. Accessed July 29, 2024; Adobe, "Set up a Programmatic Guaranteed Deal," available at: <https://experienceleague.adobe.com/en/docs/advertising/dsp/inventory/private-inventory/deal-ids/programmatic-guaranteed-deal/programmatic-guaranteed-set-up>. Accessed July 29, 2024).

⁶⁹ This is related to the distribution of values assumption in various models of auctions. See, e.g., Vijay Krishna, *Auction Theory*, Edition 2, Academic Press, 2010, at pp. 3-4.

⁷⁰ Google offers publishers a variety of ways to implement their preferences over the types of ads that can compete for their ad space. See, e.g., Google Ad Manager Help, "Protections overview," available at: <https://support.google.com/admanager/answer/2913553>. Accessed July 29, 2024 (Google offers the following example for publishers: "You decide to opt in to alcohol ads. Then, you decide to block all buyers except Advertiser A, Advertiser B, and Advertiser C. Regardless of your opt-in, the only traffic you will receive is from Advertiser A, Advertiser B, and Advertiser C. All other traffic will be blocked."). As another example, publishers can review the ads that have been shown to users on their site and impose forward-looking restrictions on which advertisers can compete for their ad space. See, e.g., Google Ad Manager Help, "Ad review center overview," available at: <https://support.google.com/admanager/answer/146769>. Accessed July 29, 2024 ("With the Ad review center, you can review individual ads after they're shown and choose whether you want to continue showing them on your pages.").

⁷¹ "Increasing the number of bidders increases the revenue on average of the seller." (R. Preston McAfee and John McMillan, "Auctions and Bidding," *Journal of Economics Literature*, Vol. 25, No. 2, 1987, pp. 699-738, at p. 711).

⁷² For instance, in a second-price auction, the highest bidder wins but pays the price of the second-highest bidder. In a first-price auction, the highest bidder wins and pays its own bid. While second-price auctions incentivize truthful bidding and first-price auctions incentivize bid shading, in some economic environments these and other auctions result in identical expected payments (See, e.g., Theorem 0 and the discussion following it in, Paul R. Milgrom and Robert J. Weber, "A theory of auctions and competitive bidding,"

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rules,⁷³ strategies employed by different advertisers and publishers,⁷⁴ quality of impressions,⁷⁵ and potentially other factors I consider throughout my report.⁷⁶

143) The fees publishers and advertisers pay for ad tech services depend on the number and value of impressions or clicks processed.⁷⁷ For example, Google charges advertisers using its DV360 buying tool a fee that is a percentage (about [REDACTED] of the value of the ad impressions purchased (called “ad

Econometrica, Vol. 50, No. 5, 1982, pp. 1089-1122, at p. 1093). In other economic environments, the expected payment may be higher in a second-price auction (See, e.g., Theorem 15 in Paul R. Milgrom and Robert J. Weber, “A theory of auctions and competitive bidding,” *Econometrica*, Vol. 50, No. 5, pp. 1089-1122, at p. 1109).

⁷³ Establishing such rules may prevent dissipative opportunism. For example, suppose an auctioneer makes significant investments to bring potential buyers and sellers of art together. Because of these investments, there is a thick market; for each painting up for sale, there are numerous potential buyers. The owner of a painting does not know how valuable the painting is, and is attracted to the auction because there are many serious buyers. Thus, the auction is valuable to a seller because the seller does not know the value of the painting. An auctioneer may impose restrictions requiring sellers to commit to sell their items to the highest bidder, and for bidders to commit to pay the price they bid. Otherwise, bidders have little incentive to submit serious bids. Establishing these rules prevents dissipative opportunism. Without such rules, an opportunistic seller could bring an item for sale, take advantage of the thick market the auctioneer created to see what the item is worth, and then withhold the item and sell it through an alternative means. While this might be beneficial to the individual opportunistic seller (e.g., avoiding paying the auctioneer’s commission or possibly fetching a higher price through negotiations that exploit this information), this reduces the value to buyers of showing up in the first place and to the auctioneer of creating a robust marketplace. Of course, other sellers would have similar incentives, thus diminishing buyers’ incentives to participate in the auction. This could start a vicious cycle, as seller incentives to participate would diminish because fewer bidders at the auction translates into lower price through the auction (and lower commissions for the auctioneer, reducing their welfare in turn). The thinner market stemming from fewer buyers and sellers at the auction reduces the auctioneer’s incentive to make the investments that allowed it to match paintings to the people valuing them the most in the first place.

⁷⁴ Publishers’ use of reserve prices (also called floor prices) is one example. A reserve price is a commitment by a seller to not sell an item unless the price is above the reserve price. It is well-known that a reserve price may raise “... the revenue to the seller but may have a detrimental effect on efficiency.” Vijay Krishna, *Auction Theory*, Edition 2, Academic Press, 2010, at p. 24.

⁷⁵ As discussed in more detail below, the investments, technologies and features of some ad tech providers may result in higher quality matches than others.

⁷⁶ I have not been asked to evaluate the impact of specific auction rules on efficiency or the welfare of specific advertisers or publishers. Instead, I have been asked to examine whether the conduct at issue harmed competition.

⁷⁷ In addition, some ad tech businesses implement minimum spend requirements for buying tools and fixed fee components of ad server pricing. For example, Google DV360, The Trade Desk, Microsoft’s Xandr Invest, Yahoo, and others utilize a minimum monthly ad-spend requirement. See Karoliina Ranne, “17 Best Programmatic Advertising Platforms to Choose From,” Nexd, March 20, 2023, available at: <https://www.nexd.com/blog/17-best-programmatic-buying-platforms-to-choose-from/>. Accessed May 24, 2024. (“... some big DSPs like Google’s DV360, The Trade Desk, Xandr and Yahoo have a minimum monthly ad-spend limit, anywhere from \$50,000-\$100,000, to access the platform. Hence, many brands must go through performance marketing agencies to access a programmatic buying platform. Some others are more flexible and do not set a minimum ad spend limit, or it is lower, such as Adform and Mediasmart or Beeswax, which has a minimum monthly spend of \$10,000 per month.”). AdButler provides a range of starting monthly fees that customers can then configure for their specific use cases. See, AdButler, “Pricing,” available at: <https://www.adbutler.com/pricing.html>. Accessed June 30, 2024. (providing plan options “Essential,” “Standard,” “Advanced,” and “Enterprise” which have differing sets of features).

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D. The Multi-Sided Nature of the Ad Tech Industry Impacts Competition and Firms' Incentives

150) Ad tech tools facilitate the matching of advertisers' ads with publishers' inventory.¹⁰⁰ The fee a publisher or advertiser pays to use ad tech is determined when a transaction occurs—i.e., when an advertiser's ad is matched with a publisher's available inventory and viewed or clicked by an internet user.

151) Ad tech tools facilitate “matches” or transactions, and operate in a multi-sided market where the products—transactions—are jointly consumed by multiple sides.¹⁰¹ Multi-sided platforms exhibit what economists call “indirect network effects,” which refer to situations where the value realized by members of one group of customers (e.g., advertisers) increases when there are more customers on the other side of the platform (e.g., publishers).¹⁰² Multi-sided transaction platforms exhibit pronounced

¹⁰⁰ Multi-sided markets are sometimes called “two-sided markets.” As David Evans notes, “[o]nline advertising is a ‘two-sided market’... , as is advertising generally.” (David S. Evans, “The Online Advertising Industry: Economics, evolution, and privacy,” *Journal of Economic Perspectives*, Vol. 23, 2009, pp. 37-60, at p. 38).

See David S. Evans and Richard Schmalensee, “Markets with Two-Sided Platforms,” *Issues in Competition Law and Policy (ABA Section of Antitrust Law)*, Vol. 1, 2008, pp. 667-693, at p. 667. (According to the two authors, two-sided platforms “serve distinct groups of customers who need each other in some way, and the core business of the two-sided platform is to provide a common (real or virtual) meeting place and to facilitate interactions between members of the two distinct customer groups.”).

¹⁰¹ For a discussion about multi-sided platforms, see Davis S. Evans, “Governing Bad Behavior by Users of Multi-Sided Platforms,” *Berkeley Technology Law Journal*, Vol. 27, 2012, pp. 1201-1250, at pp. 1203-1204. (“Multi-sided platforms create value by helping two or more different types of users, who could benefit from getting together, find and interact with each other, and exchange value.... There are positive externalities between the multiple types of users. Platforms provide ways to promote these positive externalities and thereby create value for the community of users they serve.”).

¹⁰² See David S. Evans and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, Harvard Business Review Press, 2016, at p. 27 (“A network effect is indirect when the value of a matchmaker to one group of customers depends on how many members of a different group participate.”); Catherine Tucker, “Network Effects and Market Power: What Have We Learned in the Last Decade?” *Antitrust*, Spring 2018, pp. 72-79, at p. 72. (“Economists use ‘network effects’ to describe contexts in which a good or service offers increasing benefits the more users it has. Network effects can be direct—for example, a fax machine becomes more useful as other people also use fax machines. Network effects can also be indirect so that they flow across different sets of users. For example, Uber would not be a very useful app for a rider if there were no drivers using the platform. Similarly, drivers would not want to use the Uber app if no riders were using it.”).

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3. Google's Publisher Ad Server Competes with a Variety of Other Publisher Ad Servers

169) In general, publisher ad servers facilitate the management and sale of publishers' ad inventory across a wide variety of demand sources and types of transactions. Google's publisher ad server GAM (formerly DFP) competes with numerous other companies that offer ad serving solutions to publishers. Publicly available data indicate that DFP competes with a variety of other publisher ad servers, including many publishers that have backward integrated into ad serving.¹⁴⁹

170) Companies that offer publisher ad server solutions also deploy a wide variety of business models to attract and retain publishers adopting differentiated capabilities and commercial strategies. For example, companies like Google and Microsoft (Xandr) offer fully integrated ad tech stacks to serve all sides of the market.¹⁵⁰ Other companies, like OpenX, choose to specifically focus on segments of the publisher side to partially integrate their offerings.¹⁵¹ Others, like Kevel, offer white label ad serving infrastructure allowing publishers to build custom ad solutions.¹⁵² Publishers who provide content

¹⁴⁹ See Figure 10.

¹⁵⁰ Microsoft (Xandr) offers an integrated ad tech stack. See Microsoft Advertising, "Microsoft Invest DSP," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/advertiser-platform-invest-dsp-premium-content>. Accessed July 16, 2024. The two parts of Microsoft Monetize are the Microsoft Monetize SSP (Microsoft Advertising, "Microsoft Monetize SSP," available at: <https://about.ads.microsoft.com/en-us/solutions/xandr/publisher-platforms-scaled-buying-selling-solutions>. Accessed July 16, 2024) and the Microsoft Ad Server, which is "a strategic selling platform that provides holistic inventory management controls and differentiated buyer demand to enable you to unlock the full value of your inventory" (Microsoft Advertising, "Microsoft Monetize," available at: <https://about.ads.microsoft.com/en/solutions/technology/microsoft-monetize>. Accessed July 16, 2024).

¹⁵¹ OpenX offered a publisher ad server called OnRamp and an exchange called LiftDNA. (See Zach Rodgers, "OpenX Shuts Down Its OnRamp Ad Server After Big Malware Attack," Ad Exchanger, February 11, 2013, available at: <https://www.adexchanger.com/online-advertising/openx-shuts-down-its-onramp-ad-server-after-big-malware-attack/>; AdExchanger, "OpenX Adds LiftDNA To Serve Publishers And Their Ad Server Needs Says CEO Cadogan," February 27, 2012, available at: <https://www.adexchanger.com/yield-management-tools/openx-liftdna/>).

¹⁵² [REDACTED]

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through Apple News do not pay Apple any fees for their ad serving product, Apple Workbench.¹⁵³ Publishers can also utilize free, open-source ad serving tools.¹⁵⁴ Finally, many companies have developed their own ad serving tools for use with their own web and mobile properties rather than rely on third parties for ad serving tools.¹⁵⁵

4. Ad Tech Firms Compete through Price and Investments in Quality

171) Documents in the record indicate that Google and its rivals compete for customers through product innovations that improve quality for advertisers, publishers, and users.¹⁵⁶ Examples include innovations that mitigate fraud,¹⁵⁷ protect user privacy,¹⁵⁸ improve matching to mitigate users' incentives

¹⁵³ "Apple doesn't apply ad serving fees." (Ads on Apple News, "Generate Revenue," available at: <https://support.apple.com/guide/adguide/generate-revenue-apd51c721ca9/1.0/icloud/1.0>. Accessed August 4, 2024). Similarly, Google does not charge publishers ad serving fees for using Google's Ad Mob, its in-app ad mediation platform. (Google AdMob Help "Costs," available at: <https://support.google.com/admob/answer/7356092#zippy=do-i-have-to-pay-to-use-admob>. Accessed July 16, 2024).

¹⁵⁴ "Revive Adserver is the world's most popular, free, open source ad serving system," (Revive Adserver, "Revive Adserver," available at: <https://www.revive-adserver.com/>. Accessed August 6, 2024).

¹⁵⁵ Examples include Pinterest and eBay, which each created proprietary ad tech products to serve ads on their platforms that are specifically targeted towards their users. (Pinterest Ads, "Grow your business with Pinterest ads," available at: <https://ads.pinterest.com/>. Accessed August 6, 2024; eBay Ads, "Ways to Advertise," available at: <https://www.ebayads.com/ad-solutions/ways-to-advertise/>. Accessed July 16, 2024).

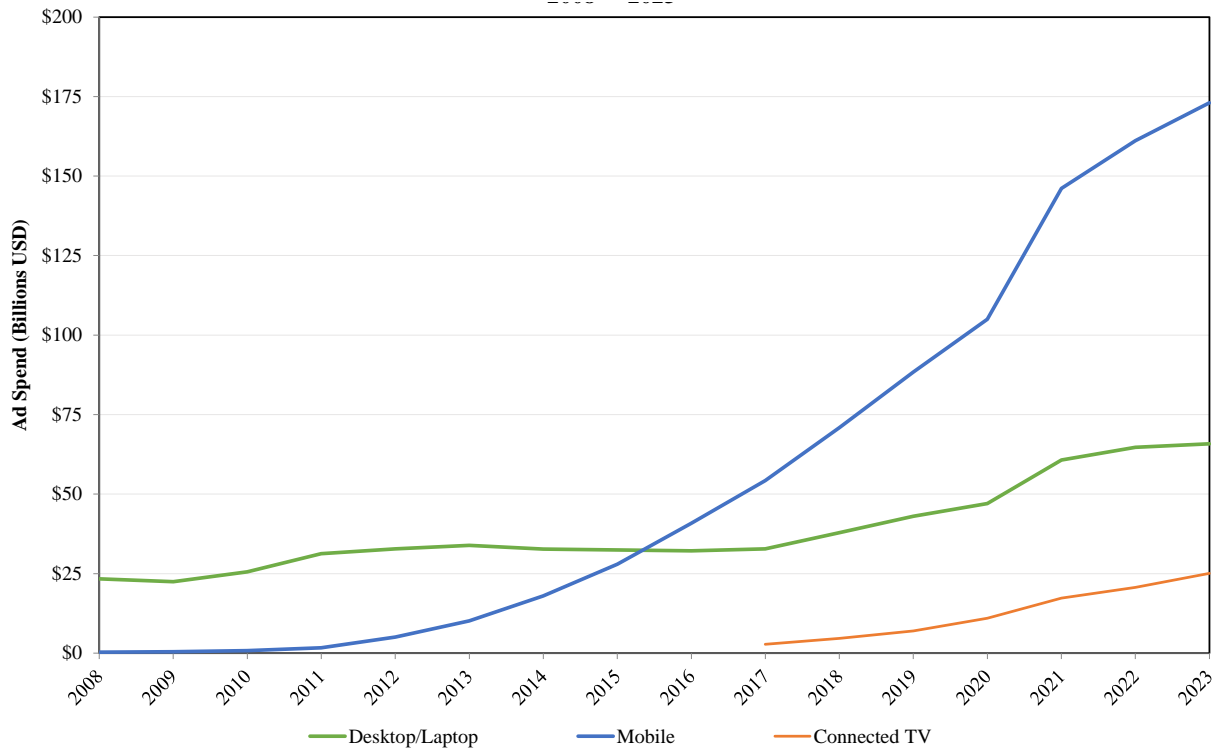
¹⁵⁶ For example, when speaking about her previous experience working for a publisher, Google managing director [REDACTED] explained that "within the course of [about ten years], [her company, About.com] did evaluate other ad servers in the potential of switching. ... At that point in time when [About.com] look [sic] at the technology, right, [it was] more concerned about which technology is going to drive better performance, but also better dollars for [About.com]. So evaluating other technologies is something that [About.com] would have done before agreeing to do business with Google because they're not the end-all, be-all at the time. Because that's what [About.com] used to say, they're not the end-all, be-all." ([REDACTED] (Google) Deposition, at 139:6-22).

¹⁵⁷ For instance, in November of 2023, Google launched its "Limited Ads Serving policy, which is designed to protect users by limiting the reach of advertisers with whom [they] are less familiar." This policy "implemented a 'get-to-know-you' period for advertisers who don't yet have an established track record of good behavior." During this period these advertisers' ads may be limited in some aspects. Google is also working to increasingly incorporate AI and Large Language Models in its fraud prevention efforts. (Duncan Lennox, "Our 2023 Ads Safety Report," Ads & Commerce Blog, March 27, 2024, available at: <https://blog.google/products/ads-commerce/google-ads-safety-report-2023/#enforcement>). Additionally, in 2020, Google introduced its advertiser identity verification program to limit fraud and scams. This allows Google to verify the identity of advertisers in order "to share the advertiser name and location in [Google's] About this ad feature, so that people know who is behind a specific ad and can make more informed decisions." (Scott Spencer, "Our annual Ads Safety Report," India Blog, March 17, 2021, available at: <https://blog.google/intl/en-in/products/google-companies/our-annual-ads-safety-report/>. Accessed August 6, 2024).

¹⁵⁸ In 2020, Google Chrome announced its intent to stop supporting third-party cookies in order to protect the privacy of users. One resulting innovation was Google's test of the Federated Learning of Cohorts API, which was considered to be "one way to effectively take third-party cookies out of the advertising equation and instead hide individuals within large crowds of people with common

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Exhibit 10
U.S. Digital Ad Spending by Device Type
2008 - 2023



Notes: Data are estimates from eMarketer. Mobile ad spending includes spending for ads on tablet devices. Includes all forms of digital ads.

Source: DOJ RFP 57 eMarketer Data – “U.S. Ad Spending 2023.”

6. Competition Among Ad Tech Companies Evolves Rapidly

179) The ad tech industry is and has been rapidly changing, necessitating the rapid adaptation of all tools that serve the needs of advertisers and publishers. According to Forbes, “AdTech is not merely a facilitator but a dynamic force reshaping the advertising landscape.”¹⁷⁸ As the behavior of users

¹⁷⁸ Kalina Bryant, “How AdTech is Transforming Digital Advertising and Driving Impact,” Forbes, January 10, 2024, available at: <https://www.forbes.com/sites/kalinabryant/2024/01/10/how-ad-tech-is-transforming-digital-advertising-and-driving-impact/>.

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evolves, ad tech firms are forced to reposition themselves, invest in quality, and innovative features. Ultimately, it is customer preferences that drive investments, updates, and new features.¹⁷⁹

180) Ad exchanges are the product of evolution in the ad tech space and have already been susceptible to further evolution in the way publishers and advertisers buy and sell ads.¹⁸⁰ In the early 2000s, before the advent of exchanges, ad networks ruled the landscape and were responsible for aggregating supply from multiple publishers and selling it to willing buyers.¹⁸¹ But as the internet and the scale of publishers evolved, so too did the needs of buyers and sellers.¹⁸² Rather than relying on a non-programmatic network to manually compile and sell publishers' supply, "the marketplace reacted by introducing ad exchanges and real-time bidding (RTB) in 2007,"¹⁸³ intensifying competitive pressure on ad networks.¹⁸⁴

¹⁷⁹ For example, in 2017, Google listed its DVAA Strategy Principle as "[i]mprov[ing] ad experiences for users" by "[t]urn[ing] the tide on negative consumer sentiment towards digital ads by aspiring delightful, relevant ad experiences for users, resulting in better ROI for advertisers and monetization for publishers." (GOOG-TEX-00348289, at -399).

¹⁸⁰ Digiday, "A History of Ad Tech Chapter 2: The Ad Net's Golden Age," December 11, 2023, available at: <https://digiday.com/media-buying/a-history-of-ad-tech-chapter-2-the-ad-nets-golden-age/>. ("The emergence of the ad exchange ... is regarded as revolutionary by most seasoned industry observers."); Emodo, "What Is An Ad Exchange And How Does It Work?" July 14, 2023, available at: <https://www.emodoinc.com/blog/what-is-an-ad-exchange/>. ("Ad exchanges are evolving to meet the changing needs of the online advertising industry, with new trends and technologies shaping their future." Common changes concern "[p]rivacy regulations," "[h]eader bidding," and "[a]rtificial intelligence and machine learning.").

¹⁸¹ Digiday, "A History of Ad Tech Chapter 2: The Ad Net's Golden Age," December 11, 2023, available at: <https://digiday.com/media-buying/a-history-of-ad-tech-chapter-2-the-ad-nets-golden-age/>. ("[T]he early 2000s was the prime era for selling online media space via ad networks.").

¹⁸² Clearcode, "The History of Digital Advertising Technology," available at: <https://adtechbook.clearcode.cc/history-advertising-technology/>. Accessed July 17, 2024 ("[A]d exchanges emerged to solve the many technical nuisances found in ad networks, such as multiple redirects, and allowed advertisers to purchase inventory on an impression-by-impression basis.").

¹⁸³ MIT Technology Review Insights, "The Evolution of Ad Tech," September 5, 2013, available at: <https://www.technologyreview.com/2013/09/05/113056/the-evolution-of-ad-tech/>.

¹⁸⁴ See, e.g., Digiday, "A History of Ad Tech Chapter 2: The Ad Net's Golden Age," December 11, 2023, available at: <https://digiday.com/media-buying/a-history-of-ad-tech-chapter-2-the-ad-nets-golden-age/>. ("[T]he emergence of ad exchanges meant buyers and sellers, i.e. the companies that had formerly been blissfully unaware of the vast margins ad networks made, could eventually take more control").

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participation of advertisers, which in turn will reduce participation of publishers. Feedback effects further deteriorate advertiser and publisher participation.

276) Google's ad tech stack is operated as an integrated, multi-sided platform; Google does not price ad tech components "as if" they were stand-alone products. For example, Google charges publishers a 20 percent revenue share on its ad exchange but does not charge fees to [REDACTED]³⁸⁰ of publishers using its ad server (including many that do not use Google's ad exchange). By not accounting for integration and indirect network effects—which both constrain the profitability of a SSNIP—Professor Gans incorrectly assesses the pricing incentives of the hypothetical monopolist. Defining distinct relevant markets around individual components of Google's integrated ad tech stack does not mirror the incentives that Google would face if it was, as Professor Gans claims, a monopolist in one or more of his candidate markets.

277) As discussed above, Professor Gans fails to demonstrate that relevant ad impressions are limited to his narrow definition. Data and survey results indicate that customers multi-home across different types of ads, platforms, and types of deals, and are well-positioned to substitute alternatives that Professor Gans excludes (e.g., video ads, mobile in-app ads, social media ads, and direct deals). Survey results indicate that advertisers would substitute these alternatives were a SSNIP imposed in Professor Gans' candidate markets. As I showed earlier, Plaintiffs' narrow definition of display ads accounts for [REDACTED] of all ad spend in the United States, and excludes significant volumes of ad spend

³⁸⁰ See Figure 45. As discussed in more detail in Section IX, Google's pricing of its ad tech is lower as a result of it operating an integrated ad tech stack than would prevail if it priced these components separately. Again, this is true even in the absence of indirect network effects between advertisers, publishers, and users; indirect network effects provide additional incentives for a multi-sided platform to charge lower prices.

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corresponding increase in price. In my opinion, these data are inconsistent with Google having monopoly power and instead show a highly competitive industry.

292) Similar trends exist with respect to ad exchanges and ad servers. As shown earlier, the average revenue share for narrow display ads on Google's AdX has remained stable at 20 percent since its inception, despite advancements in quality discussed in more detail below.⁴¹¹ It is also clear that Google's prices for DFP are below stand-alone monopoly prices. As shown by the data, ad serving fees on DFP have decreased since January 2014,⁴¹² and more than [REDACTED] of Google's ad serving

⁴¹¹ See Exhibit 18. In 2010, an internal Google document titled "Evolution of the Industry & AdX History," Google noted that "[w]ith a revenue share of 20%, DoubleClick made [REDACTED] on the first AdX transaction[.]" (GOOG-AT-MDL-015269020, at -030). Figure 50 shows that Google collects lower revenue shares for non-Open Auction transactions that it facilitates (i.e., Private Auction, Programmatic Guaranteed, Preferred Deals, and Open Bidding).

⁴¹² See Exhibit 4. Figure 51 demonstrates that GAM ad server fees on an impression basis where product is Standard or Advanced Display have (on average) remained under [REDACTED] per thousand billed units since February 2017.

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customers paid no fees at all.⁴¹³ Moreover, some publishers that paid ad server fees did not pay for their first 90 million impressions served each month.⁴¹⁴ These data are consistent with internal documents.⁴¹⁵

⁴¹³ Figure 45 demonstrates that, from 2020 to 2023, over [REDACTED] of Google Ad Manager customers paid no ad serving fees.

⁴¹⁴ Google offers two types of accounts for use of its GAM (DFP) ad server: small business and premium (GAM360). Small business accounts may serve 90 million standard impressions for free and are generally are not charged ad serving fees on Google-sourced impressions (AdX and AdSense). *See* DoubleClick for Publishers, “DFP Small Business online standard Terms & Conditions,” available at: <https://www.google.com/doubleclick/publishers/small-business/terms/>. Accessed May 31, 2024 (“Using the Program, You are permitted to serve without being charged up to 90 million impressions per month to non-video ad units if You are located in the United States of America.”). Separate thresholds apply for video ad serving. GAM360 accounts receive no standard lump sum of “free” impressions but may not pay for ad serving on Google-sourced impressions. *See* Google Ads Manager Help, “Ad Manager billing setup,” available at: <https://support.google.com/admanager/answer/6214526>. Accessed August 6, 2024 (“[I]mpressions monetized by Ad Exchange or AdSense are not billed.”).

Google’s AdMob does not charge fees for mediation (e.g., serving mobile in-app ads). AdMob only earns revenue through ads it sells. Although AdMob mediation is free, some publishers use GAM to serve both their mobile app ads and their web-based ads and pay ad serving fees for these mobile in-app ads. *See* Google AdMob Help, “How AdMob works,” available at: <https://support.google.com/admob/answer/7356092>. Accessed July 16, 2024 (“Do I have to pay to use AdMob? No, using AdMob is free. Even better, Google and any third-party ad networks you use will pay you for clicks, impressions, and other interactions with the ads you display in your app.”); Google AdMob Help, “House ad,” available at: <https://support.google.com/admob/answer/3212684>. Accessed May 31, 2024 (“During AdMob mediation, you can traffic house ads using your own inventory free of charge.”).

See Google Ad Manager Help, “Compare Ad Manager, AdSense, and AdMob,” available at <https://support.google.com/admanager/answer/9234653>. Accessed May 31, 2024.

⁴¹⁵ GOOG-AT-MDL-008552137, at -152; GOOG-DOJ-13252505, at -506-508; GOOG-TEX-00441752, at -796. (“Overview of Pricing Structure. Free: 90M impressions cap.”).

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C. The Evidence is Inconsistent with Professor Gans' Conclusion that Google Tied the Use of Its Publisher Ad Server to the Use of Its Ad Exchange

456) Professor Gans argues that publishers could only use AdX if they also agreed to use DFP (i.e., that Google tied DFP to AdX).⁷⁹¹ He further claims that Google was able to impose this purported tie by limiting access to Google Ads demand to publishers using AdX.⁷⁹² Contrary to Professor Gans' narrative, there is no evidence that publishers were forced to use DFP. Publishers had multiple ways other than through DFP to access AdX and bids from Google Ads. Google developed several technological means for publishers to access its ad exchange and Google Ads, including publisher tags, AdX Direct, and Project Yavin.⁷⁹³ Additionally, and as noted earlier, there is evidence that a significant number of Google Ads advertisers multi-home on non-Google buying tools, meaning their demand is available on non-AdX exchanges.⁷⁹⁴ I discuss these and other features of data and the record that are inconsistent with Professor Gans' conclusions.

⁷⁹¹ Gans Report, at ¶414 (“Here, Google tied its AdX ad exchange with its DFP ad server. These are independent products with separate demand for each product. Google conditioned the use of AdX (the tying product) with the sale of its DFP ad server (the tied product).”).

⁷⁹² Gans Report, at ¶415 (“Google’s tying conduct involved three of its AdTech tools at different time periods: Google’s ad server (DFP), Google’s ad exchange (AdX), and Google’s ad-buying tool for small advertisers (AdWords, later Google Ads).”); Gans Report, at ¶416(b) (“Around the same time, Google limited its ad-buying tool for small advertisers to Google’s ad exchange (AdX), making Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a “must-have” exchange.”).

⁷⁹³ Professor Gans acknowledges these options in his report. (See Gans Report, at ¶353, fn. 379, ¶429). Google started developing Project Yavin (also known as “Ad Connector”) in June 2017, with the goal of targeting publishers that used a “[p]roprietary ad server” and thus, were unlikely to consider using Google’s ad server (GOOG-DOJ-03634896, at -908; GOOG-DOJ-13233139, at -142). Examples of publishers who participated in the Project Yavin are eBay, LinkedIn, and Snapchat (GOOG-DOJ-AT-02321586; GOOG-DOJ-AT-02324779; and GOOG-DOJ-AT-02225544). AdX Direct refers to pieces of code (also known as “tags”) that publishers can place on their websites, allowing them to request demand from AdX even if they don’t use DFP (Google, “Generate Ad Exchange ad tags,” available at: <https://support.google.com/admanager/answer/7501422>. Accessed July 26, 2024). See also GOOG-AT-MDL-C-000017381, at -382 (“Ad Connector (internally also known as ‘Yavin’) is a service that allows Google Ads and DV360 to bid into ad auctions conducted on publishers’ proprietary ad servers. Because Ad Connector requires custom integrations between Google and each customer’s ad server, it was offered to customers on a one-off basis based on Google’s available integration resources.”); GOOG-DOJ-AT-02160057, at -063 (noting that Ad Connector works by directly integrating Google Ads and DV360 into the auction run inside the publisher’s ad server, whereby they compete in real time with demand from third-party exchanges).

⁷⁹⁴ Deposition of George Levitte (Google) on August 10, 2021, (hereafter “Levitte (Google) Deposition”), at 37:1-3. I note that Figure 137 shows that a non-trivial amount of Google Ads advertisers transact on non-AdX exchanges.

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appears to suggest that a matching platform that is not fully open to rivals engages in tying one side of its platform to the other. As a matter of economics, such an approach would likely chill procompetitive conduct, as it would appear to transform the procompetitive benefits of integration described in Section VIII—and the efficient matching of buyers and sellers—into a potential antitrust violation.

461) Were Google unable to protect its investments,⁸⁰⁴ or otherwise forced to ignore complementarities between DFP and other elements of its ad tech stack, data and economic theory indicate that many publishers—and nearly all small publishers—would face higher stand-alone ad server fees. This would harm users because publishers would have less money to invest in content, and so users would see lower-quality input due to the higher publisher ad serving fees. In the present context, Google’s low fees for DFP—even for larger publishers using direct deals that bypass AdX entirely—induce a richer supply of available impressions for advertisers using Google’s buy-side tools (Google Ads and DV360), some of which bid into AdX, contributing to a healthy ecosystem for advertising on internet that better competes with walled gardens.⁸⁰⁵ In short, Professor Gans’ notion of a tie ignores all of these considerations stemming from integration and indirect network effects.

2. Publishers Could and Did Access Google’s Ad Exchange Without DFP

⁸⁰⁴ Publishers who use DFP at the subsidized price to sell inventory outside of Google’s ecosystem opportunistically exploit Google’s investments in DFP that make the tool so attractive. In an internal strategy document from 2018, Google notes that they “offer a lot of flexibility in [its] [Ad Manager] product, which many publishers leverage to get a free product. [REDACTED] of [Google’s] active [GAM] publishers don’t use AdX or AdSense. Most of these publishers are in the free tier of [Google’s] [Ad Manager] product, meaning they get an entirely free product. When [Google] think[s] about [its] costs for computing resources, serviceability, sales, and product / eng[ineering] support, these publishers represent a significant tax on [Google’s] business.” (GOOG-DOJ-13218256, at -256).

⁸⁰⁵ GOOG-DOJ-04004392, at -398. (“[T]he most important reason the Sellside exists is to bring quality, fair (preferable if possible) reach to our demand. There is definitely truth to the belief that we help a lot of sites/apps stay in business and that in return helps keep the web and apps ecosystem open[.]”).

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462) My review of the relevant documents leads me to conclude that publishers using third-party ad servers have had, and continue to have, access to AdX demand as well as access to advertising dollars spent by advertisers that use Google Ads through a variety of means. This is inconsistent with Professor Gans' claim that Google restricted the ability of publishers using a non-Google ad server to trade through Google's exchange—whether by restricting publishers using third-party ad servers from receiving live, competitive bids from its exchange,⁸⁰⁶ limiting those publishers' access to purportedly “unique” Google Ads demand in Google's ad exchange, or otherwise.

463) As an initial matter, Professor Gans himself recognizes that some publishers who use AdX do not need to use DFP to access it.⁸⁰⁷ Moreover, [REDACTED] percent of publishers using DFP do not use AdX.⁸⁰⁸ These data are inconsistent with Professor Gans' notion that access to Google Ads through AdX drives publishers to adopt DFP.

464) Data indicate that the share of AdX publishers in a given month that use AdX Direct—which allows publishers to query AdX regardless of DFP usage⁸⁰⁹—exclusively or in combination with DFP is significant, averaging [REDACTED] percent and [REDACTED] percent, respectively, over the sample period (June 2013 to March 2023).⁸¹⁰ More specifically, the data reveal that over this period, the share of publishers

⁸⁰⁶ See Gans Report, at ¶457, 407. (“[P]ublishers seeking to sell inventory to [Google Ads] advertisers must use AdX.” “The tie put publishers in a position that if they wanted to access [Google Ads] demand, they needed to use Google's ad server, DFP.”).

⁸⁰⁷ See Gans Report, at Figure 12.

⁸⁰⁸ See Exhibit 27. See also Figure 138, showing that there are 49,805 publishers in Professor Gans' candidate market not using AdX, compared to 15,173 publishers using AdX.

⁸⁰⁹ I note that whether the publishers who use AdX Direct also have DRX/GAM contracts or not is irrelevant. These publishers are still exercising an option that would allow them to leverage a third-party ad server with no loss of functionality compared to their current setup, if they chose to do so. The fact that they do (or do not) choose to use GAM alongside AdX Direct is an indicator of their preference for Google's offerings, not evidence of a tie.

⁸¹⁰ See Figure 139 and Figure 140

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who (1) exclusively use AdX Direct to access AdX, or (2) use a mix of AdX Direct and DFP to access AdX never fell below [REDACTED] percent from 2013 to 2018 (two years after the alleged tie occurred), and never fell below [REDACTED] percent prior to November 2022.⁸¹¹ As a threshold matter, that such a large number of publishers are able to sell impressions on AdX without using DFP is inconsistent with Professor Gans' assertion that publishers were compelled to adopt DFP to gain access to AdX demand. That is, the data are inconsistent with there being a tie as Professor Gans claims.⁸¹²

3. Publishers Could and Did Access Google Ads Demand Without DFP

465) The data are also inconsistent with Professor Gans' claim that "unique" Google Ads demand rendered AdX a "must have," accessible only to publishers using DFP.⁸¹³ Before exploring the ways in which Google Ads advertisers' dollars are available through alternate channels, I note that Google's choice to have Google Ads bid primarily into AdX is not a unique arrangement in ad tech. Other ad tech companies also reserve certain demand as exclusive to their ad exchange solutions as a means of attracting more demand from publishers. Google even notes that Amazon and Facebook offer "robust and unique demand to rival [Google Ads]."⁸¹⁴ YieldLove, a header bidding exchange that frequently purchases inventory from publishers states that its publishers "[b]enefit from exclusive access to Ströer

⁸¹¹ See Figure 140.

⁸¹² Professor Gans states that "Google foreclosed publishers using third-party ad servers from selling to Google's exchange." (Gans Report at ¶407). The fact that publishers accessing AdX through means other than DFP are not receiving exactly the same interface as publishers accessing AdX through DFP is due to more efficient technical integration between these parts of Google's ad tech stack, as discussed in Section VIII.B. That a publisher must use the integrated components to receive the benefits of integration is not a tie, but an artifact of the intrinsic benefits from combining complements discussed in Section VIII.A.

⁸¹³ Professor Gans asserts that "[a]round the same time, Google limited its ad-buying tool for small advertisers to Google's ad exchange (AdX), making Google Ads demand exclusive to AdX amongst exchanges, and leading publishers to consider AdX a "must-have" exchange." Further, Professor Gans alleges that "[s]tarting in 2016, Google contractually tied its ad exchange (AdX) and its publisher ad server (DFP), meaning that publishers wanting to access AdX demand in any form (in real-time or otherwise) were forced to sign a combined DFP-AdX contract. (Gans Report, at ¶416(b); ¶416(d)).

⁸¹⁴ GOOG-DOJ-13952875, at -878. In the same internal slide deck, Google also notes that "Google has strongest total offering for publishers but [Facebook] and Amazon are gaining ground." (GOOG-DOJ-13952875, at -883).

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experienced substantial growth during the alleged tie, which undermines Professor Gans' opinion that the availability of Google Ads through third-party exchanges is limited.⁸²³

469) These findings are inconsistent with Professor Gans' conclusion that Google forced publishers to use DFP as a condition of using AdX.

4. Access to Real-Time Bids is a Feature, Not a Product

470) Professor Gans also claims that Google only allowed publishers that license Google's ad server to receive live, competitive bids from its exchange.⁸²⁴ As a matter of economics, tying occurs when one distinct product is sold only with another distinct product.⁸²⁵ Having reviewed relevant documents and data, I find that competing publisher ad servers could access live demand from AdX, but were constrained to serving an ad if, once called, AdX identifies a winning bidder in excess of the publisher's floor price.

471) Regardless, Professor Gans has not established that there is a relevant product market for real-time bids. What Professor Gans considers to be the "product" to which DFP is being tied is access to a feature of AdX (access to real-time bids) offered to publishers who license DFP.⁸²⁶ More

⁸²³ Gans Report, at ¶423. ("The limited availability of AdWords demand through third party exchanges meant that the "must-have" nature of AdX to publishers persisted beyond 2016.").

⁸²⁴ Gans Report, at ¶435 ("As early as 2009, Google had technology that allowed third-party ad servers to solicit bids in real-time from AdX in a way that benefited publishers. Google, however, elected not to bring that technology to market."); Gans Report, at ¶¶568-569 ("Google's ad server refused to provide publishers with the ability to solicit simultaneous live bids from multiple exchanges[, but] allowed AdX, and only AdX, to compete in real-time against all non-guaranteed inventory.").

⁸²⁵ "Tying refers to the behavior of selling one product (the tying product), conditional on the purchase of another product (the tied product)." (Jean Tirole, "The Analysis of Tying Cases: A Primer," *Competition Policy International*, Vol. 1, 2005, pp. 1-25, at p. 8).

⁸²⁶ Gans Report, at ¶422 ("This transformed AdX into a 'must-have' exchange. [...] According to Brian O'Kelley, the publisher rationale for AdWords being a 'must-have' is that 'with Google having a unique demand source, switching away from AdX or switching away from DFP would mean losing one of the largest demand sources, if not the largest demand source, and, therefore, would have

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specifically, Professor Gans claims that non-DFP publishers were relegated to receiving static bids from AdX.⁸²⁷ Professor Gans ignores that healthy non-price competition routinely involves firms enhancing features of existing products. Viewing the evolution of the features of a product as an anticompetitive tie would chill innovation and stifle non-price competition.

472) What Professor Gans claims is a tie not actually a tie of one product to another (i.e., DFP to AdX), but rather a choice by Google to provide certain functionality of AdX (i.e., real-time bids) only to publishers using its integrated server, DFP. Viewed in this context, there is nothing unusual about a feature of an integrated firm's product working more efficiently with its own complementary products than with third-party products. Indeed, one would expect to observe this given the incentives of an integrated multi-sided platform discussed in Section IX. Real-time bidding comes with data processing and transmission requirements—that is, costs. This feature requires building pipelines that get publisher data (e.g., characteristics of a current visitor) to an advertiser quick enough to submit a real-time bid. Professor Gans does not consider that providing this feature exclusively through DFP might be simpler, cheaper, and impose lower latency costs.

5. Google's DRX Contracts Do Not Force Publishers to Use DFP

significant monetization implications, or cost you a lot of money, or could, if you left.”); Gans Report, at ¶457; 407 (“[P]ublishers seeking to sell inventory to [Google Ads] advertisers must use AdX.” “The tie put publishers in a position that if they wanted to access [Google Ads] demand, they needed to use Google’s ad server, DFP.”). See Gans Report, at ¶¶568-569 (“Google’s ad server refused to provide publishers with the ability to solicit simultaneous live bids from multiple exchanges[, but] allowed AdX, and only AdX, to compete in real-time.”).

⁸²⁷ Gans Report, at ¶416(c). (“Starting in 2009, Google imposed technical limitations preventing publishers using third-party publisher ad servers from selling to Google’s ad exchange (AdX) in real-time open auctions.”).

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501) In 2019, Google made two closely related auction changes. First, it announced that Google Ad Manager would move from a second-price auction to Unified First Price Auction (UFPA).⁸⁹³ In a second-price auction, the high bidder wins but only pays the second-highest bid (or the floor price, if the floor price is higher than the second-highest bid). As I explain in Section V.C, in a first-price auction, the high bidder pays the amount of its bid. Most other exchanges ran first-price auctions.⁸⁹⁴ Google's movement to UFPA obviated the need for differential price floors across ad exchanges.⁸⁹⁵ While Professor Gans speculates about Google's motives, Plaintiffs do not contend this change to UFPA was anticompetitive.⁸⁹⁶

⁸⁹³ Sam Cox, "Simplifying Programmatic: First Price Auctions for Google Ad Manager," Google Ad Manager, March 6, 2019, available at: <https://blog.google/products/admanager/simplifying-programmatic-first-price-auctions-google-ad-manager/>; GOOG-DOJ-12077412, at -412.

⁸⁹⁴ GOOG-DOJ-10736364, at -367.

⁸⁹⁵ Milgrom Report, at ¶520 ("Before Google introduced the UFPA, publishers using GAM could improve both efficiency and revenue by setting different floor prices for bidders or demand sources depending on the order in which they were called. This important justification of setting different floor prices for different exchanges was eliminated in the UFPA, as discussed by Google engineers."); Milgrom Report, at ¶549 ("Let us see how setting exchange-discriminatory floor prices could help publishers maximize revenues in a system where the winning bids from multiple exchanges were evaluated sequentially. For example, consider a publisher that sequentially calls two exchanges in the waterfall: Exchange A before Exchange B. Suppose that the publisher believes that the distributions of advertiser values at both exchanges are identical and that the values of bidders at each exchange are statistically independent. Then the publisher's revenue-maximizing floor price for Exchange A is higher than that for Exchange B. This is because, by choosing a higher floor price for Exchange A, the publisher can try to extract a higher price from the first exchange, knowing that it can offer the impression to Exchange B if it fails to sell on Exchange A. Similarly, exchange-specific (and impression-specific) floor prices could improve publisher revenues when header bidding exchanges and AdX were not called simultaneously and used different auction rules, as I discussed in Section X.").

⁸⁹⁶ Professor Gans insinuates that Google's move to a first-price auction was motivated by a desire to "weaken Header Bidding." Gans Report, at ¶485 ("Another 2018 email acknowledges that the roll-out of the first-price auction would weaken Header Bidding, stating 'we get the move to IP done which will make HB much less valuable.'"). However, more effective competition against header bidding is procompetitive, not anticompetitive. Moreover, Google documents suggest that its move to a first-price auction was an adaptation to market changes. For example, Google documents indicate that "the participants in Google's auction ... are on a 2nd price auction, whereas [Exchange Bidders] are on a 1st price auction, as are most header bidding integrations. This means that Authorized Buyers are not always able to compete on equal footing with other demand sources, and also creates confusion over auction dynamics about how the 2nd price and 1st price auctions interact. As a result, we'll move to a 1st price auction for everyone in 2019." (GOOG-DOJ-10736364, at -364). Similarly, "[m]any exchanges began to move from second-price to first-price auctions in the mid-to-late-2010s." Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393), at ¶7. By moving to first price auctions, "[it] saw a neutral to positive impact on a publisher's total revenue, and found evidence that first price auctions [] created a more competitive market, resulting in third parties ... and indirect line items (like those from header Bidding implementations) winning an increased share of impressions." (GOOG-AT-MDL-004300215, at -217).

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indicate that discounting has resulted in “a declining trend in effective Google revenue shares across [Private Auction] and [Programmatic Direct] over time.”⁹⁶²

526) In sum, the documentary record describing increased discounting over time and data indicating flat to declining DV360 and AdX average fees are broadly inconsistent with Professor Gans’ claims that UPR harmed competition with regard to large advertiser buying tools or ad exchanges, and Professor Gans has made no attempt to demonstrate that DV360 or ad exchange fees would have been even lower but for the imposition of UPR.

B. Dynamic Allocation and Enhanced Dynamic Allocation Had A Legitimate Business Rationale and Did Not Harm Competition

527) The opinions of Professor Gans, Professor Weinberg, and Professor Pathak regarding the competitive effects of Dynamic Allocation (DA) and Enhanced Dynamic Allocation (EDA) are not supported by the data or the documents.⁹⁶³

1. Background on Dynamic Allocation (DA) and Enhanced Dynamic Allocation (EDA)

⁹⁶² GOOG-DOJ-AT-01978287, at-287-306.

⁹⁶³ Professor Gans asserts that DA and EDA harmed competition in his narrow candidate ad exchange market. In particular, Professor Gans asserts that under DA, “AdX was afforded a right of first refusal on publisher’s non-guaranteed inventory” and that EDA “extend[ed] AdX’s right of first refusal to direct deals.” (Gans Report, at ¶548). He concludes that “[t]he antitrust harm arising from these actions has the same economic structure as the harm identified with respect to UPR” because “had Google not been vertically integrated into the exchange market, it would not have had the incentive to use its market power in the ad server market to steer transactions towards its own ad exchange, AdX.” (Gans Report, at ¶550). Professor Pathak alleges that EDA “diminished publishers’ ability to be selective with demand sources and publishers had to allow for the possibility of AdX serving lower-quality ad impressions for their most premium inventory.” (Pathak Report, at ¶173). Professor Weinberg claims that Dynamic Allocation led to higher win rate and higher revenue for AdX as well as lower win rate and lower revenue for non-Google exchanges. Additionally, if AdX typically transacts ads of lower quality than non-Google exchanges, Dynamic Allocation also led to an increase in the display of lower quality ads.” (Weinberg Report, at ¶120). Professor Weinberg also alleges that “Enhanced Dynamic Allocation likely led to an increase in win rate and increase in revenue for AdX and reduced the value of direct deals for advertisers, which would in turn decrease the revenue earned by publishers via direct deals.” (Weinberg Report, at ¶137).

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528) Dynamic Allocation (DA) was an innovation that allowed a publisher to get real-time bids from AdX and, if higher than the anticipated value attributed to the publisher's indirect programmatic demand sources, serve the AdX advertisement.⁹⁶⁴

529) Prior to Google's acquisition of DoubleClick and through at least July of 2007, DFP publishers called indirect programmatic demand sources using a so-called waterfall mechanism.⁹⁶⁵ DA was incorporated into the DFP product prior to its acquisition by Google and changed the way DFP sourced ads for remnant inventory.⁹⁶⁶ Under DA, DFP calculated a "floor price" for each inventory item that was equal to the publisher's highest value CPM (vCPM) across all of its demand sources.⁹⁶⁷ DFP then sought a bid from AdX, which ran a real-time auction. If AdX returned a CPM above the floor price, then the AdX ad would be served.⁹⁶⁸ If AdX returned a CPM below the floor price, then the best

⁹⁶⁴ Google Ad Manager Help, "Ad competition with dynamic allocation," available at: <https://support.google.com/admanager/answer/3721872?hl=en>. Accessed April 1, 2024.

⁹⁶⁵ When a remnant impression became available under the waterfall, publishers specified an order for each demand source to be called and a reserve price, termed the "vCPM," for each demand source. Publishers could enter any value for the vCPM, but Google suggested that publishers use the historical average CPMs, which is information the publisher could access through DFP on a per-line item basis. Publishers could set a higher reserve price if an ad network tended to serve lower quality ads, or a lower reserve price if the publisher had a negotiated relationship with a particular demand source. Publishers could set both the reserve prices and the order on an individual impression basis. DFP "ranks all eligible remnant line items [...] by their value CPM" which is a value that publishers can enter when they set up their line items. See Google Ad Manager Help, "Line item types and priorities," available at: <https://support.google.com/admanager/answer/177279>. Accessed April 1, 2024.

DFP called demand sources for bids according to the publisher's order, and DFP served the ad of the first demand source that was willing to pay more than its reserve price. When AdX was called in the waterfall, it conducted a live auction and returned the winning CPM to DFP (less the exchange fee), but the other exchanges and ad networks returned static bids, or bids based on set parameters defined by advertisers. (Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393, at ¶¶10, 12).

⁹⁶⁶ GOOG-TEX-00722592, at -626 (showing "dynamic allocation of inventory" as a part of the DoubleClick Marketplace - Ad Exchange); GOOG-TEX-00439764, at -764 ("Key features and benefits of the feature include: ... Dynamic Allocation. Publishers simply specify the areas of their inventory open for competition and for every impression delivered, the booked rate will be compared to the best bid available from the AdSense system. AdSense will only be delivered if the net eCPM for the publisher is higher than the rate booked in DFP."); GOOG-TEX-01243467, at -467 ("This feature adds an Admob line item type that lets publishers use Dynamic Allocation when backfilling app inventory to Admob").

⁹⁶⁷ Declaration of Nitish Korula on August 4, 2023, at ¶¶10-11.

⁹⁶⁸ Prior to September 2019 when AdX was operating second-price auctions, AdX submitted the second highest AdX bid (less the exchange fee) to DFP. After AdX switched to a first-price auction in September 2019, AdX submitted the highest bid (less the exchange fee) to DFP. See GOOG-DOJ-06525908, at -912-913.

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remnant line item would be selected to serve to the impression; if the demand source corresponding to this line item did not have an ad to serve, then DFP requested bids from other demand sources sequentially and served the ad of the first demand source that returned a CPM above its own reserve price.⁹⁶⁹ This process ensured that AdX transacted impressions under DA only if it was able to provide the publisher with revenue larger than the expected revenue from the waterfall, which was often based on historical averages.⁹⁷⁰

530) Enhanced Dynamic Allocation (EDA) was an innovation introduced into Google's ad server that allowed publishers to fulfill their commitments on guaranteed ad inventory while allowing programmatic ads bidding at high prices to serve before all guaranteed deals have been fulfilled.⁹⁷¹ When EDA was introduced in 2014, DFP was using DA to seek competitive bids only for remnant inventory. EDA built on DA to enable indirect demand in DFP to compete for guaranteed inventory.⁹⁷² Google

⁹⁶⁹ Just as in the waterfall, publishers were able to specify the order for DFP to call each demand source in the sequential process, and they could use historical CPMs to ensure that higher value demand sources were higher in the order. (Internet Archive, "DFP and dynamic allocation," available at: https://web.archive.org/web/20140916152734/https://support.google.com/dfp_premium/answer/3447903. Accessed April 5, 2024.)

⁹⁷⁰ Alise Zaiceva, "Header bidding vs waterfall differences explained," Setupad, available at: <https://setupad.com/blog/header-bidding-vs-waterfall/>. Accessed July 31, 2024. ("In programmatic waterfall, SSPs/ad networks are ranked based on the average historical performance they have produced for the publisher. This means that SSPs/ad networks with the best record of eCPM, fill rate, latency, etc., will be at the top. The impressions are then passed from one SSP/ad network to another until they're sold."). To illustrate DA, consider how DFP would handle the ad inventory of a publisher with a single placement that gets an average of 1,000 impressions per day. As the publisher receives impressions, DFP would first serve guaranteed ads. If the publisher has a direct agreement with an advertiser to display an ad 600 times per day, then DFP would serve the guaranteed ad to the first 600 impressions at the agreed-upon price. As each of the remaining 400 impressions becomes available, DFP would use DA to source an ad, first requesting a bid from AdX and remnant line items, then turning to the other demand sources sequentially if the highest bid from AdX and remnant line items did not exceed the floor price for the impression. *See* Google Ad Manager Help, "Line item types and priorities," available at: <https://support.google.com/admanager/answer/177279>. Accessed April 1, 2024.

⁹⁷¹ GOOG-DOJ-06885161, at -161 ("Enhanced Dynamic Allocation[:] ... Generally availability roll-out began on 3/3/2014... Enhanced Dynamic Allocation (formerly called "Cross-Priority Ranking," CPR) introduces competition between reservations and AdX by allowing AdX (or AdSense) to bid on high priority DFP impressions (any goal-based ad in the reservation priorities) without compromising reservation goals. It calls AdX for every reservation impression and uses the reserve price to control how often we expect AdX to fill the impression. When a reservation ad is further behind, the reserve price will be higher.").

⁹⁷² GOOG-DOJ-06885161, at -161 ("Enhanced Dynamic Allocation[:] ... Generally availability roll-out began on 3/3/2014... Enhanced Dynamic Allocation (formerly called "Cross-Priority Ranking," CPR) introduces competition between reservations and AdX

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header bidding impressions, in aggregate, than header bidding publishers for which EDA likely did not apply.¹⁰⁰⁷

- c. In addition, once Open Bidding launched in April 2018, third-party exchanges were able to bid in real-time against AdX for “impressions.”¹⁰⁰⁸ All guaranteed reservation impressions from publishers who chose to use Open Bidding were made available to third-party exchanges at the same time as AdX, and to the extent that such impressions were not sent to Open Bidding, it was due to the publisher’s choice.

C. Line Item Capping Had a Legitimate Business Rationale and Did Not Harm Competition

550) The data show that line item capping had procompetitive justifications and did not harm competition.¹⁰⁰⁹

1. Background on Line Item Capping

551) In Google’s ad server, publishers create line items to identify the types of ad inventory that they will offer to various sources of demand (ad exchanges, ad networks, directly sold campaigns). “Line items contain information about how specific ad creatives are intended to serve to your website or app

¹⁰⁰⁷ See Figure 164.

¹⁰⁰⁸ Declaration of Nitish Korula on August 4, 2023 (GOOG-AT-MDL-008842393, at ¶23); Google Ad Manager Help, “Ad competition with dynamic allocation,” available at: <https://support.google.com/admanager/answer/3721872?hl=en>. Accessed April 1, 2024.

¹⁰⁰⁹ Professor Gans alleges that: “[t]he third way in which Google impaired the use of its ad server products was by imposing restrictions on “line items” to limit the use of Header Bidding by publishers.” Professor Gans claims that “[w]hile Google offered various technical explanations for the caps, these were pretextual.” Professor Gans further alleges that “[b]y capping the number of line items publishers can set, Google’s ad server then artificially limits the competitiveness of Header Bidding exchanges compared to its own ad exchange, impairing price competition in the ad exchange market.” Gans Report, at ¶¶634, 646, 661.

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along with pricing and other delivery details.”¹⁰¹⁰ Line items also contain the requirements that publishers set for the ad to be selected.¹⁰¹¹ For example, the publisher may implement a direct deal negotiated for sports pages targeted at males between the ages of 18 and 32 by setting up tags such that, when such an impression arrives, the direct deal will serve specifically to that group.¹⁰¹²

552) Header bidding takes advantage of the targeting feature associated with line items. Implementing header bidding with DFP involves creating line items where every price would be associated with a line item and each line item would be targeted at a key value that specified the price. For example, if a publisher would accept anywhere from \$0.50 to \$1.00 (what the publisher believes to be reasonable lower and upper bounds) for an impression, they may implement header bidding by setting up separate line items for every \$0.01 increment within that range of prices—in this example, 51 separate line items.¹⁰¹³ Because implementing header bidding “could mean having to create thousands of line items, most companies will automate these steps.”¹⁰¹⁴

553) In December 2013, Google imposed limits on the number of line items, capping publishers at 61,000 active line items per publisher network “to protect the health of the product [and] the

¹⁰¹⁰ Google Ad Manager, “About line items,” available at: <https://support.google.com/admanager/answer/9405477>. Accessed April 1, 2024.

¹⁰¹¹ Google Ad Manager, “About line items,” available at: <https://support.google.com/admanager/answer/9405477>. Accessed April 1, 2024.

¹⁰¹² I based this example on a similar scenario from Google’s support pages. See Google Ad Manager Help, “Get started with key-values,” available at: <https://support.google.com/admanager/answer/188092>. Accessed April 1, 2024.

¹⁰¹³ Oko Ad Management, “The Header Bidding Process,” available at: <https://oko.uk/blog/the-header-bidding-process>. Accessed April 1, 2024.

¹⁰¹⁴ Prebid, “Google Ad Manager with Prebid Step by Step,” available at: <https://docs.prebid.org/adops/step-by-step.html>. Accessed April 1, 2024; Prebid, “How to simplify line item setup,” available at: <https://docs.prebid.org/overview/how-to-simplify-line-item-setup.html>. Accessed April 1, 2024.

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performance of [Google's] system.”¹⁰¹⁵ The limit was imposed after a publisher had 8,000,000 active line items, causing “a huge strain on the system.”¹⁰¹⁶

554) Although internal communications from as early as 2014 reflect the importance of line item limits for the stability of Google's ad server,¹⁰¹⁷ the line item cap was not enforced until the end of 2018.¹⁰¹⁸ After enforcement of the line item cap, publishers who tried to create more than 61,000 active line items without obtaining an exception from Google would receive an error message.¹⁰¹⁹ Google engaged in proactive outreach to notify those publishers close to exceeding the limit (or that had already exceeded the limit) that the limits would be enforced and created a flexible approach to allowing exceptions for those publishers through January 31, 2019.¹⁰²⁰

2. Professor Gans' Analysis of Line Item Capping Does Not Support a Conclusion that it Anticompetitively Steered Customers to AdX

¹⁰¹⁵ GOOG-DOJ-09494195, at -195 (“Limits are necessary in order to protect the health of the product, the performance of our system, and are ultimately for the benefit of all publishers and the performance of their UI.”); GOOG-DOJ-09494195, at -198 (“This [active line item] limit is not enforceable but is the max number of [line items] that can be supported by the ad server without additional engineering changes.”); GOOG-AT-MDL-004345238, at -245; GOOG-DOJ-13340828, at -828.

¹⁰¹⁶ GOOG-DOJ-09494195, at -202; GOOG-DOJ-13340828, at -828.

¹⁰¹⁷ GOOG-DOJ-13340828, at -828 (“We always knew that we needed limits because they are a core component of a sound stability strategy for any world-class system. If we could have waved a magic wand and had limits in place years ago, we would [have].”).

¹⁰¹⁸ There were two types of active line item enforcement: Small Business and Premium (GAM360). Premium is the paid premium version of GAM360, which caters to publishers with larger volumes of traffic, more complex advertising setups, or more advanced needs. See generally Bea Jankowska, “Google Ad Manager vs Google Ad Manager 360 – Everything You Need to Know,” Yieldbird, <https://yieldbird.com/research-hub/google-ad-manager-vs-google-ad-manager-360-everything-you-need-to-know/>. Accessed July 18, 2024. Small Business enforcement officially started by December 2018 and Premium was slated to start on January 2, 2019. See GOOG-DOJ-06883919, at -919; GOOG-DOJ-15127379, at -380; GOOG-DOJ-AT-01816818, at -821.

¹⁰¹⁹ GOOG-DOJ-AT-01816818, at -818, -822 (“Q: How will a Publisher know if they’ve exceeded either the ALI or Active Ad Unit limit? A: They will be unable to create new entities and will receive an error message letting them know they have exceeded the limit if they try to do so.”); Google Ad Manager Help, “System maximums and limits,” available at: <https://support.google.com/admanager/answer/1628457>. Accessed April 1, 2024. (“Google Ad Manager enforces the following limits [including active line item limit] to ensure system stability”).

¹⁰²⁰ GOOG-DOJ-AT-01816818, at -821. Google made clear that “the objective is not to disrupt any of those pubs operations, so the plan is to [sic] flexible on allowing exceptions.” (GOOG-DOJ-15127379, at -380).

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562) Similarly, Google’s “System maximum and limits” guidelines, including those regarding the use of active line items, define a set of rules for transacting ad inventory through GAM that help protect the system overall.¹⁰²⁹ There are legitimate business and procompetitive reasons for Google to enforce its guidelines, including those regarding the use of active line items. Actions that protect DFP’s reliability and performance are procompetitive, benefiting customers through a higher quality product, leading to an increase in publisher demand for Google’s ad server, and ultimately benefiting advertisers as they are offered a larger number of ad impressions.

563) Google’s enforcement of the line item cap on publishers prevents adverse publisher experience with Google’s DFP ad server that could impede their ability to sell ad inventory. Google observed that “[p]ublishers can slow or crash infrastructure and create fire-drills” by using large numbers of line items.¹⁰³⁰ In 2016 and 2017, Google began to see an increase in the number of publishers exceeding the active line item limit.¹⁰³¹ Sometimes, there were 1,000 times more line items than the system was designed to support.¹⁰³² One publisher “almost crashed” Google’s ad serving stack by implementing one million active line items.¹⁰³³ Documents also describe, through 2017, a high volume

¹⁰²⁹ Google Ad Manager Help, “System maximums and limits,” available at: <https://support.google.com/admanager/answer/1628457>. Accessed April 1, 2024.

¹⁰³⁰ GOOG-DOJ-07955876, at -890.

¹⁰³¹ GOOG-DOJ-07955876, at -882.

¹⁰³² Deposition of [REDACTED] (Google) on November 6, 2020, GOOG-AT-MDL-007172126 (hereafter “[REDACTED] (Google) Deposition”), at 50:5-20 (“Q: And why was using line items for realtime pricing a risk to Google’s AdServer? A: The way the system was built is that line items were always intended to be reservations. There wasn’t a concept of using them for realtime pricing. And so we had in mind that publishers would have, you know, possibly thousands of line items and the system was built to scale to that, but with using line items for realtime pricing, which is not what they were designed to be used for, there were ten, sometimes ten times, sometimes 100 times, sometimes 1,000 times more line items than the system was designed to support.”).

¹⁰³³ The Network Health Team at Google clearly identified these infrastructure-related issues (among others) and categorized them as “Systemic Risk” and “Expense” problems. (GOOG-DOJ-06875572, at -592, -574). The same Google strategy document demonstrates quite clearly that Google used line item caps as a method to protect against these issues. In other words, Google reactively enforced line item caps to protect the quality of their product and manage costs. (GOOG-DOJ-06875572, at -598).

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of line items posed a risk of system overload for DFP,¹⁰³⁴ leading to infrastructure outages that required Google to incur additional engineering expenses to remediate.¹⁰³⁵ In 2018, Freestar exceeded the line item cap which resulted in 578.5 million ad queries in DFP dropped (1.5 million dropped for Freestar, 577 million dropped for other publishers).¹⁰³⁶ Because excessive line items posed a threat to the ad server, there was an internal push within Google for more adherence to the limit.¹⁰³⁷

564) Google's enforcement of the line item cap is also consistent with the legitimate business justification of limiting costs.¹⁰³⁸ Specifically, Google noted that every incremental 60,000 line items is associated with a 1- to 2-percent increase infrastructure costs.¹⁰³⁹

¹⁰³⁴ For example, in a report from December 2017 Google notes that "a 'publisher used a third party script to automatically change their setup via the DFP FE. Their reconfiguration resulted in their queries returning 1700 ads for many of their queries, increasing the memory required for processing those queries, and likely also slowing down the processing of those queries.'" (GOOG-AT-MDL-C-000017978, at -979). "[Google] disabled the publisher ... since they were hurting system health and abusing [Google's] system." Additionally, Google notes a list of "[t]hings that went poorly" which included the following point: "A publisher was able to make a change that caused serious system instability." (GOOG-AT-MDL-C-000017978, at -980). Similarly, in a report from May 2018, Google notes another issue caused by "an increase in GFP PSI lookups for a specific publisher that returned ~100-500 ads per request." (GOOG-AT-MDL-C-000018330, at -331-332). Further, in a report from June 2018, Google notes that a "publisher UOL created a large n[umber] of native styles (~2000) with a large n[umber] of key-value targeting terms (~220) associated with each style, the cost/time of processing the request in the PSI matchlet increased geometrically," which caused a problem that lasted "20 hours+." (GOOG-AT-MDL-C-000018393, at -394-395).

¹⁰³⁵ [REDACTED] (Google) Deposition, at 54:6-11. ("We had to have more computer resources to be able to manage all the line items and we had more engineering costs related to emergencies whenever somebody would create a lot of line items and then it put our system at risk."); [REDACTED] (Google) Deposition, at 204:15-19. ("[M]anaging the extra line items, frequently caused emergency outages that required engineers to be up through the night, on weekends to address it and impacted other publishers.").

¹⁰³⁶ GOOG-AT-MDL-C-000018303, at -304.

¹⁰³⁷ See, e.g., GOOG-DOJ-13376687, at -689 ("Starting an engineering e-mail thread 'for discussing the long term solution on active line item limits' and considering the role of header bidding.").

¹⁰³⁸ An internal Google presentation titled "PRD/Strat[egy] review: Network health" notes that "[t]he health team works from the shadows to protect our systems and our margins" with some of the risks noted being to "prevent systemic risk" and "manage infra[structure] expense." (GOOG-DOJ-06875572, at -574).

¹⁰³⁹ GOOG-DOJ-06875572, at -586.

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indicate that the share of all AdX open auction impressions won by Google Ads buyers was decreasing during and after the implementation of Bernanke.¹¹⁶⁴

B. Dynamic Revenue Share Was a Legitimate Business Innovation that Did Not Harm Competition

618) In my opinion, DRS was a procompetitive feature that enhanced competition on the merits between Google and other exchanges. DRS allowed AdX to compete for marginal impressions by lowering the fees Google charges publishers. The result was increased publisher revenue and quality of matches through growth in the number of publisher impressions that were matched with advertisers. In this section, I explain that Professor Gans confuses the enhanced competition brought about by DRS with anticompetitive foreclosure. I show that Professor Gans' data analysis includes calculation errors that render his conclusions flawed and unreliable. I also show that DRS affected only a small subset of impressions and therefore could not plausibly have foreclosed competition. Finally, I show that in those instances in which DRS did apply, it benefited publishers by increasing their revenue and advertisers by resulting in more high-quality matches.

1. Background on Dynamic Revenue Share

619) DRS was a sell-side optimization feature implemented in Google's ad exchange that was designed to increase the frequency that auctions ended with a winning buyer by dynamically changing Google's revenue share on a per query basis.¹¹⁶⁵ Prior to the implementation of DRS, Google charged

¹¹⁶⁴ Google Ads buyers won about [REDACTED] of U.S. AdX open auction impressions in Summer 2013 before the initial launch of Bernanke, before steadily declining to the under [REDACTED] of impressions won in Spring 2023, as shown in Figure 173. This is not the product of Google Ads buyers decreasing their ad spend on AdX as both they and buyers using other tools increased their level of ad spend over the same period. Figure 174 shows that in June of 2013 the gross revenue of Google Ads publishers was consistently higher than other publishers, whereas by 2021, the gross revenue levels of the two groups had reached similar levels.

¹¹⁶⁵ GOOG-DOJ-15130321, at -321.

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publishers a fixed revenue share for transacting on AdX and, unless otherwise negotiated, that revenue share was 20 percent.¹¹⁶⁶ Bids in AdX competed on a net-bid basis (i.e., Google's revenue share was subtracted from the amount that a bidder offered before the bid was submitted to compete in the auction).¹¹⁶⁷ If no net bid was at least as high as the reserve price set by the publisher, the impression would not be matched on AdX and it may or may not have been matched on another ad exchange. A Google analysis indicated that [REDACTED] of publishers' impressions had gone unfilled if they failed to clear on AdX.¹¹⁶⁸

620) DRS was designed to solve the problem of unmatched impressions and took effect when no AdX bids cleared the auction reserve price set by the publisher.¹¹⁶⁹ Google identified auctions in which the highest bid was above the AdX reserve price but fell below the reserve price after Google's revenue share was deducted. This region of bid prices was referred to as the "dynamic region."¹¹⁷⁰ By allowing Google to adjust the revenue share it took on these transactions, DRS increased the likelihood that a match would be made, which ultimately benefited publishers as well as advertisers. In other words, DRS was a method through which Google was able to compete more aggressively by lowering its fees to clear publishers' inventory.

¹¹⁶⁶ GOOG-DOJ-03619484, at -484.

¹¹⁶⁷ GOOG-DOJ-06867901, at -903-04.

¹¹⁶⁸ GOOG-DOJ-06134599, at -615 ("Simplicity: one way to target, one way to optimize, one set of reporting entities, etc. Of the [REDACTED] that do not compete, having a single inventory unit will allow us to learn more about the impression and how to get it into auction (e.g. was it a real opportunity and if so, what do we need to do/build to capture it? capturing less than half of each of these segments would help us see growth.) [REDACTED] impressions currently matched per month; grow to [REDACTED] (breakdown of impressions we compete and lose on is [REDACTED] Direct, [REDACTED] Indirect, [REDACTED] House, [REDACTED] Unfilled; if we could get at least [REDACTED] of Indirect, and [REDACTED] of House and Unfilled, we could grow by [REDACTED]).

¹¹⁶⁹ GOOG-DOJ-03619484, at -484.

¹¹⁷⁰ GOOG-DOJ-13199952, at -954.

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621) Documents describe three versions of DRS. The first version (DRS v1) was introduced in August 2015 and only lowered revenue shares.¹¹⁷¹ The second version (DRS v2) was introduced in December 2016 and it allowed AdX to recoup the lower fees charged on some auctions by raising fees on others, while maintaining an average revenue share consistent with their contracts.¹¹⁷² Both DRS v1 and DRS v2 did not use any data about the advertiser, publisher, or user beyond basic details describing the auction including the bid prices, revenue shares, and the reserve price. Finally, in July 2018, Google launched Truthful DRS (“tDRS”), which, as will be detailed later, could have been implemented by any ad exchange.¹¹⁷³

622) DRS was discontinued when Google shifted AdX to the Unified First Price Auction (UFPA) in September 2019.¹¹⁷⁴ Under tDRS, for each impression, AdX’s revenue share would be determined based on the predictions for AdX buyers’ bids.¹¹⁷⁵

2. Professor Gans’ Analyses of DRS Do Not Support His Conclusion that DRS Harmed Ad Exchange Competition, Publishers, or Advertisers

623) Professor Gans’ data analyses of DRS contain several material errors that result in him drawing incorrect conclusions. First, he does not implement the data corrections specified in Google’s

¹¹⁷¹ GOOG-DOJ-15068390, at -390.

¹¹⁷² Declaration of Nitish Korula (August 4, 2023), GOOG-AT-MDL-008842393, at ¶33; GOOG-DOJ-14718514, at -514.

¹¹⁷³ GOOG-DOJ-13949282, at tab “Q3Q4 2018,” row 7.

¹¹⁷⁴ Declaration of Nitish Korula (August 4, 2023), GOOG-AT-MDL-008842393, at ¶36; GOOG-DOJ-15130321, at -321.

¹¹⁷⁵ GOOG-DOJ-13227256, at -260 (“[I]f the prediction is below the threshold set by us, we will make the publisher reserve revshare [redacted] (i.e. decrease adx revshare to [redacted]); otherwise, we will keep the original publisher reserve revshare of [redacted].”). When AdX’s choice was to apply [redacted] revenue share to the impression and the impression sold, tDRS would add “debt” to the publisher’s balance equal to the revenue that Google lost due to choosing a [redacted] revenue share. See GOOG-DOJ-13227256, at -261 (“When the final publisher sellside revshare is higher than the base_revshare [redacted], then we add the amount difference between base revshare and final sellside revshare onto this publisher’s account as debt.”).

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DRS v1 resulted in a match rate increase of [REDACTED] for AdX publishers selling to third-party DSPs (AdX Buyers).¹²¹⁶ This increase in newly matched queries corresponded with a [REDACTED] increase in spending from advertisers using third-party DSPs.¹²¹⁷ Subsequently, an experiment examining the effect of DRS opt-out found that the removal of DRS would lead to decreases in matched queries and revenue for third-party DSPs of [REDACTED] and [REDACTED], respectively.¹²¹⁸ A higher match rate is in the best interest of a third-party DSP as it means more advertiser budget is successfully spent, which results in more total revenue for the DSP from fees charged to advertisers.

642) Documents also indicate that the ability to implement programs like DRS was not unique to Google. Nationwide, for example, had “negotiated with [third-party] exchanges that the [third-party exchange] will take a lower take rate from Nationwide and pass the savings back to the buyer.”¹²¹⁹ In 2017, the Guardian accused Rubicon Project of charging undisclosed buyer fees.¹²²⁰ Rubicon Project’s (now Magnite) 10-K filings indicate that it “typically charged buyers a variable price for real-time bidding impressions without specifying the amount or method of determination of the fee that is included in the price.”¹²²¹ Another ad exchange, PubMatic, explained to Ad Exchanger that “it calculates the fees on an impression-by-impression basis” and that this calculation takes into consideration the bid-stream

¹²¹⁶ GOOG-DOJ-14368357, at -357.

¹²¹⁷ GOOG-DOJ-14368357 at -358.

¹²¹⁸ GOOG-DOJ-AT-02427522, at -522.

¹²¹⁹ GOOG-DOJ-13504758, at -758.

¹²²⁰ Sarah Sluis, “Explainer: More On The Widespread Fee Practice Behind The Guardian’s Lawsuit Vs. Rubicon Project,” Ad Exchanger, March 30, 2017, available at: <https://www.adexchanger.com/ad-exchange-news/explainer-widespread-fee-practice-behind-guardians-lawsuit-vs-rubicon-project/>.

¹²²¹ Rubicon Project March 2017 10-K, at 22.

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density (a.k.a. number of buyers) and “the difference between an advertiser’s bid and the clearing price.”¹²²²

643) Contrary to Professor Gans’ assertion that Google tried to conceal DRS,¹²²³ documents indicate that Google provided publishers with the opt-out option for DRS beginning in June 2016 through a public announcement and a pop-up that appeared in the AdX UI.¹²²⁴ By February 2017, just 269 publishers (representing no more than 16 percent of all U.S.-based AdX publishers at the time) had opted out.¹²²⁵ DRS was designed to enable more auctions to end with a winning buyer,¹²²⁶ thereby getting more transactions cleared and allowing publishers to capture additional revenue.¹²²⁷

644) Professor Gans also claims that Google revealed DRS to publishers in summer 2016 and falsely told them that it would “increase a publisher’s yield”¹²²⁸ when Google internally acknowledged

¹²²² Sarah Sluis, “Explainer: More On The Widespread Fee Practice Behind The Guardian’s Lawsuit Vs. Rubicon Project,” Ad Exchanger, March 30, 2017, available at: <https://www.adexchanger.com/ad-exchange-news/explainer-widespread-fee-practice-behind-guardians-lawsuit-vs-rubicon-project/>. Accessed June 29, 2024.

¹²²³ Fourth Amended Complaint, at ¶326. *See* Gans Report, at ¶779 (“Google chose not to make publishers aware of the take rates for each transaction. This was an intentional choice by Google. Instead, in later implementations, publishers were given an opportunity to opt out of DRS but without proper information to make that choice.”).

¹²²⁴ Google Ad Manager Help, “2016 releases archive, June 13 Change history update, SafeFrame for creative types, Deal check bid filter, Apply per-query revenue share optimization,” available at: <https://support.google.com/admanager/answer/7421657?sjid=10086602547051235141-NA#zippy=%2Cjune-change-history-update-safe-frame-for-creative-types-deal-check-bid-filter-apply-per-query-revenue-share-optimization>. Accessed May 10, 2023. The pop-up was displayed for over two months, until August 1st. Internally, Google referred to this as a “butter bar.” (GOOG-DOJ-15195905, at -907).

¹²²⁵ The number of AdX publishers was determined using the gfp_network_id field in Diversity data. There are 1,654 unique network IDs that appear in February 2017. This means the share of AdX publishers that opted out was [REDACTED]. Note that AdX-Direct publishers are given a catch-all network ID of zero, which means the true number of U.S. publishers using AdX is likely greater. Thus, [REDACTED] represents the maximum share of AdX publishers that opted-out of DRS by February 2017 (see Diversity Data).

¹²²⁶ GOOG-DOJ-15130321, at -321.

¹²²⁷ GOOG-DOJ-14718514, at -514.

¹²²⁸ Fourth Amended Complaint, at ¶327. *See* Gans Report, at ¶837 (“When Google launched DRS v2, it publicly represented that its revenue share optimizations increased publishers’ yield.”).

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properties.¹³²⁰ Google encourages advertisers to load these campaigns with a variety of different types of ad creatives including text, image, and video ads to be used by the campaign and provides tools to help drive advertisers to use an optimal mix of ad types.¹³²¹

2. *Google DV360*

6) Similar to Google Ads, DV360 does not limit its capabilities to display and video, but allows users to manage their campaigns across different ad types. “Display & Video 360 enables marketers to manage their ... campaigns across display, video, TV, audio, and other channels, all in one place.”¹³²² Further, DV360 does not limit its ads to certain environments or types of content. Users can build line items for a variety of environments, including YouTube, Connected TV, Mobile, and Digital-Out-of-Home.¹³²³ Both of these aspects are part of DV360’s “integrated solution for end-to-end advertising campaigns.”¹³²⁴ Clearly, DV360 considers an end-to-end solution to include far more than just narrow display ads.

¹³²⁰ Examples include “Performance Max” and “Smart campaigns[;]” “[w]ith a single Performance Max campaign, reach the customers most likely to buy from you wherever they’re browsing - on Search, YouTube, Gmail, Maps, Display, & Discovery[.]” (Google Ads, “Drive better results with Performance Max,” available at: https://ads.google.com/intl/en_us/home/campaigns/performance-max/. Accessed April 26 2024). “When you sign up for a Smart campaign, you’ll write an ad that describes your business. You’ll also choose which keyword themes you want to target your ad and set a budget. Your ad will automatically show to potential customers across Google Search, Google Maps, YouTube, Gmail, and Google partner websites.” (Google Ads Help, “How Smart campaigns work,” available at: <https://support.google.com/google-ads/answer/7652860>. Accessed April 26, 2024).

¹³²¹ “Add as many versions of text, image, and video assets as possible (including different image sizes). This helps you reach consumers in more relevant ways depending on their context and mindset, and allows you to promote your business in more places. The more assets you provide, the more ad formats the campaign can create, and the more inventory your ads can appear on. Use Ad Strength to help you understand if you have the optimal asset mix, where you can improve, and to ensure you can run on all available inventory.” (Google Ads Help, “Multiply conversions with Performance Max,” available at: <https://support.google.com/google-ads/answer/11189316/>. Accessed April 26, 2024).

¹³²² Google Marketing Platform, “Product Overview: Display & Video 360,” available at: https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf. Accessed April 26, 2024.

¹³²³ Display & Video 360 Help, “Build line items,” available at: https://support.google.com/displayvideo/topic/9057931?hl=en&ref_topic=9060428&sjid=11517590257194476040-NA. Accessed April 26, 2024.

¹³²⁴ Google Marketing Platform, “Product Overview: Display & Video 360,” available at: https://services.google.com/fh/files/misc/display_and_video_360_product_overview.pdf. Accessed April 26, 2024.

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remedies could have similar unintended consequences, since restricting the manner in which Google can compete may reduce the vigor with which it competes against other companies.¹³¹¹

675) Even if Professor Pathak's remedies were optimal under current market conditions (which he has not demonstrated), the fact that desktop narrow display ads (non-video and non-social network) account for less than 10 percent of digital advertising¹³¹² coupled with the rapid evolution of the ad tech industry means that the potential benefits of fixing a purported monopoly power problem by Professor Pathak's imperfect remedies likely pale in comparison to future costs stemming from chilling the incentives for Google and other firms to invest in solutions to mitigate harmful externalities and functionally integrate technologies to compete with present and future of ad-supported digital technologies. History teaches that regulatory solutions are far less nimble than market solutions.¹³¹³ In short, even if Professor Pathak's proposed remedies were capable of efficiently managing the variety of externalities in the ad tech industry today, it is highly likely that these solutions would be suboptimal in the future.



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¹³¹¹ "Regulation and Competition – A Literature Review," Swedish Agency for Economic and Regional Growth, Report 0218, March 2017, available at: <https://tillvaxtverket.se/download/18.6855bfcf184896002ff9fa/1668765678928/Regulation%20and%20Competition.pdf>, pp. 1-24, at p. 15. ("For example, restricting a business from expanding its market share or growing its profit may reduce the vigor with which that business competes against other businesses (OECD, 2016).").

¹³¹² See Exhibit 1.

¹³¹³ Alfred E. Kahn, *The Economics of Regulation*, Vol. 1 and 2, John Wiley and Sons, 1970-1971, at p. xii.